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Revision of the Bee Genus *Braunsapis* in the Oriental Region
(Apoidea: Xylocopinae: Allodapini)¹

BY STEPHEN G. REYES

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ABSTRACT

The genus *Braunsapis* from the oriental region is revised; 19 species are treated. Eight species are described as new, namely: *B. flaviventris*, *B. malliki*, *B. clarihirta*, *B. apicalis*, *B. lateralis*, *B. signata*, *B. aurantipes* and *B. indica*. *Allodape marginata* Smith, *A. parvula* Smith and *A. pumilio* Cockerell are synonymized under *B. mixta* (Smith). *Allodape sauteriella* Cockerell is synonymized under *B. hewitti* (Cameron). *Allodape iwatai* Sakagami is synonymized under *B. puangensis* (Cockerell). *Allodape cupulifera bakeri* Cockerell and *A. hewitti sandacanensis* Cockerell are synonymized under *B. cupulifera* (Vachal). Likewise, *Allodape mindanaonis*

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Cockerell is placed under *B. philippinensis* (Ashmead). *Allodape mindanaonis reducta* Cockerell is elevated to specific level as *B. reducta* (Cockerell). Important characters used in discriminating the oriental species are discussed. Keys and illustrations are provided.

INTRODUCTION

This paper is a preliminary revision of the genus *Braunsapis* of the oriental region. This area includes India and Pakistan, the Indo-China region, southern China, Taiwan, the Philippines, Malaysia, and most of Indonesia including the smaller Sunda Islands. New Guinea and the Solomon Islands have been excluded and their species are treated in an account of Australian species (Reyes, in press).

Braunsapis is the largest and most widespread genus of Allodapini, ranging from Africa, where it is abundant and diversified, across southern Asia as far as Taiwan and the Solomon Islands, and south to the northern half of Australia. These are small, slender, black bees that nest in dead pithy stems, with immature stages free in the burrow and not in individual cells.

In a series of papers, Michener (1966b, 1969, 1970, 1975a, b, 1976, 1977a, b; Michener and Scheiring, 1976) revised the tribe Allodapini at the generic level, as well as the species of Africa, using characters of both adults and immature stages. At present, there are 13 genera recognized in the tribe Allodapini; the genus *Braunsapis* is believed to be closely related to *Effraetapis*, *Allodape* and *Nasutapis*. Smith described the first oriental species as *Prosopis mixtus* in 1852, and other early authors assigned oriental species either to the genus *Allodape* or *Prosopis*. *Prosopis* is a wholly unrelated colletid bee that superficially resembles *Braunsapis*. Asian species were placed in the genus *Allodapula* for a time (Michener, 1966a); Michener (1969, 1975a) recognized *Allodapula* as a strictly African group and proposed the name *Braunsapis*. The only allodapine bees found in the oriental region are in the genus *Braunsapis*.

Prior to the present study, 18 trivial names had been proposed for species in the genus *Braunsapis* from the oriental region as here defined. There have been a few biological papers on some species (Maeta et al., 1984,

1985; Sakagami, 1960; Shiokawa and Michener, 1977), but nothing has been done to treat the group from the oriental region in a more comprehensive manner. There is difficulty in studying the group if one is limited to comparing adults. At least in Africa, larval characters are more evident than adult characters (Michener, 1975b, 1976). In some instances, adults are mainly separated by size (as indicated by head width) and clypeal markings, as in the case of *B. picitarsis* and *B. philippinensis* (see below). Others such as *B. cupulifera* and *B. hewitti* have the females sometimes barely distinguishable, but in the males the trochanter is lobed distally and excised medially in the former and simple in the latter. While it would be ideal to have clear-cut characters to distinguish the closely related species of oriental *Braunsapis*, this is not the case for the adults, especially the females. It is best, therefore, to take these distinctions among closely related species as hypotheses until other characters, particularly larval characters, can be incorporated into the study to provide evidence for or against the conclusions presented below. The purpose of this paper is to provide a taxonomic framework for the scarce and widely scattered information on oriental *Braunsapis*. Other studies, especially on biological and behavioral aspects of this particularly interesting group of bees, should be encouraged.

Braunsapis (along with other genera of allodapine bees on other continents) is of special interest because of the abundance of pairs of extremely similar species (Michener 1975a), the strong larval characters (Michener, 1975b, 1976), and the primitively social behavior in which a minority of the nests contain two or more adult females, one of which is queen-like (Sakagami, 1960; Wilson, 1971; Michener, 1971, 1974, 1990).

MATERIALS AND METHODS

In the descriptions, measurements in parentheses are those of the type specimens. Characters

are numbered to facilitate comparison among species. The numbering system is similar to the one developed for a study of Australian species (Reyes, in press). Various characters that are the same for all oriental species are omitted, so that the numbers are not consecutive. Only the first species within each species group is fully described; characters of other species that are similar to the first species are omitted in the following descriptions. Characters similar to those described for the females are omitted in the description of males, e.g., the color of the pronotal lobe, tegula and axillary sclerites and the length of malar space, because they fall within the range described for the females. Characters denoted by asterisks in the descriptions further help in distinguishing the species but alternatives are not specified for all the species. Thus the notation "legs orange" for one species is not countered by "legs wholly or largely dark" for all other species. Some characters are abbreviated as follows: fourth to sixth metasomal terga as T4-6, seventh and eighth metasomal sterna as S7 and S8. HW refers to head width and HW/HL refers to the head width/length ratio.

Genitalia and mouthparts were examined in glycerin after clearing with KOH at room temperature and normalization with acetic acid. Illustrations of genitalia and mouthparts were made from such preparations, using an ocular grid. Scanning electron photomicrographs were obtained using a Philips 500 electron microscope. Bright reflections on the facial photographs were dulled by applying a diluted solution of India ink.

Abbreviations or acronyms used for the different museums or collections are given below. I thank the following individuals and institutions for the loan of specimens:

AEI—American Entomological Institute, Gainesville, Florida (H. K. Townes).
 Bangalore—Department of Entomology, University of Agricultural Sciences, Bangalore, India (B. Mallik).
 Berlin—Humboldt University Museum, Berlin, Germany (F. Koch).
 Bishop—Bernice P. Bishop Museum, Honolulu, Hawaii (G. M. Nishida).
 BMNH—The Natural History Museum, London (G. R. Else).
 Budapest—Hungarian Natural History Museum, Budapest, Hungary (J. Papp).
 CAS—California Academy of Sciences, San Francisco (N. D. Penny).
 CMNH—Carnegie Museum of Natural History, Pittsburgh, Pennsylvania (C. W. Young).
 CN—Canadian National Museum, Ottawa, Canada.
 CU—Cornell University, Ithaca, New York (G. C. Eickwort).
 Delhi—Indian Agricultural Research Institute, New Delhi, India (S. Ghai).
 Genoa—Museo Civico di Storia Naturale, Genova, Italy (V. Raineri).
 FSAG—Faculté des Sciences Agronomiques de

l'Etat, Zoologie Générale et Appliquée, Gembloux, Belgium (A. Pauly).
 Hokkaido—Entomological Institute, Hokkaido University, Sapporo, Japan (S. F. Sakagami).
 IZAS—Institute of Zoology, Academy of Sciences, Beijing, China (Y. Wu).
 LNHM—Natural History Museum of Los Angeles County, California (R. R. Snelling).
 Leiden—Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands (C. van Achterberg).
 MCZ—Museum of Comparative Zoology, Cambridge, Massachusetts (J. M. Carpenter).
 NMNH—National Museum of Natural History, Smithsonian Institution, Washington, D.C. (R. J. McGinley).
 Osaka—Osaka City University, Osaka, Japan.
 Oxford—Hope Department of Entomology, Oxford University Museum, Oxford, England (C. O'Toole).
 Paris—Muséum d'Histoire Naturelle, Paris, France.
 SMUK—Snow Entomological Museum, University of Kansas, Lawrence, Kansas (C. D. Michener).
 UPLB—Museum of Natural History, University of the Philippines at Los Baños, College, Laguna, Philippines (C. R. Baltazar).
 USUL—Systematics and Bee Biology Laboratory, Utah State University, Logan, Utah (T. Griswold).
 ZM—Zoologisk Museum, Copenhagen, Denmark (B. Petersen).

CHARACTERS

Comments on the characters used in distinguishing the species are given so that the reader may have an idea of the limitations of these characters. Furthermore, comments are also included on some characters that differ in importance in different areas and species groups. The terminology is that of Michener (1975) except as otherwise indicated for the male genitalia.

a) Body length. Measured with ocular micrometer with the body in lateral view. This is only a rough approximation because of the variations in the position of the head and metasoma and the telescoping of the latter.

b) Color of labrum and mandible. Yellow labrum and mandibles are common in males but not in females. Males with lobed and excised hind trochanters have yellow mandibles and labrum while those with simple trochanters have a yellow labrum and black mandibles. A few females have yellowish mandibles, e.g., *B. reducta*, *B. reversa*, *B. signata*, *B. palavanica*, *B. aurantipes* and *B. clarihirta*.

c) Clypeal mark. This character is quite useful in the females, especially when used in combination with other characters such as head width and type and color of hairs on T4-6. The clypeus is either entirely yellow (Figs. 73, 80) or partly black below with the clypeal mark narrowing toward the apex (Figs. 67, 69), or the clypeus is largely black with a T-shaped clypeal mark (Figs. 71, 90, 98). In the males, clypeal markings are more

extensive, and the yellow on the lower half of the clypeus is seldom reduced.

d) Paraocular mark. Paraocular marks are more common in males than in females. Females of *B. palavanica*, *B. clarihirta*, *B. lateralis* and *B. apicalis* have paraocular marks, a character useful in separating females of these four species from those of other oriental species. The utility of this character in males is suspect since there is a tendency for reduction or loss as in *B. palavanica* and *B. hewitti*.

e) Color of pronotal lobe. Unlike the species from Australia, the pronotal lobes are yellow in all oriental *Braunsapis*. This is character 5 in the descriptive format for the Australian species (Reyes, in press), but it is not useful here and therefore is omitted in the descriptions of the oriental species.

f) Color of tegula and axillary sclerites. All the sclerites of the wing bases are referred to as axillary sclerites. Tegular color is relatively consistent in most species and ranges from transparent to slightly infuscated mesally; in a few species it ranges from translucent fuscous to fuscous. Axillary sclerites are yellow in species with transparent tegulae and yellow, mixed or fuscous in those with translucent fuscous or dark tegulae. Most oriental species have transparent tegulae and yellowish axillary sclerites.

g) Head width. This character is especially useful in separating closely related species such as *B. mixta*, *B. picitarsis*, *B. philippinensis*, *B. reversa* and *B. signata*. Measurements in parentheses are those of holotypes.

h) Head width/head length ratio. The heads of oriental species of *Braunsapis* are usually broader than long; only *B. aurantipes* and *B. indica* of the *cupulifera* species group have the head as long as or longer than broad.

i) Malar space. Shorter than width of scape in all oriental species. This is character 9 in the descriptive format for Australian species (Reyes, in press), but it does not have any utility in the discrimination of oriental species and is therefore omitted from the descriptions.

j) Middle of the epistomal suture. Slightly raised in most oriental species and not as useful for separating the oriental species as for those from the Australian region.

k) Length of scape. Larger specimens with head width over 1.53 mm have the scape reaching the front ocellus or sometimes the posterior ocelli, especially in the largest individuals. Smaller individuals with the head width 1.53 mm or less have the scape not reaching the front ocellus.

l) Basitibial plate. This plate is defined posteriorly by a carina that is sometimes indistinct. In contrast to larger individuals from Australia, which usually have a distinctly raised or acute carina ending in a conical protuberance, oriental species have at most a distinct carina while in the majority of species it is indistinct.

m) Hairs on T4-6. The hairs concerned are on the middorsal parts of the fourth to sixth metasomal

terga. Lateral parts of the terga have simple hairs over twice as long as the width of scape. The middorsal hairs may be long or short; the former are usually suberect, curved or slanting, while the latter are usually subprostrate or prostrate. The longer hairs may be spiculate (about as long as width of scape) as in *B. mixta* (Fig. 107), blunt as in *B. hewitti* (Fig. 106) or simple as in *B. puangensis* (Fig. 105). Blunt or simple hairs are usually longer than the width of scape. Simple means slender and tapering to a point. The color varies from transparent to light fuscous or fuscous to black. Hair form, length and color are sometimes useful in separating species. Hair colors and forms in males are quite similar to those of females, but may differ slightly, e.g., if the hairs are spiculate and transparent in the female, they may be spiculate or blunt and light fuscous in the male.

n) Male hind trochanter. Either notched mid-ventrally and lobed apically (Fig. 100) or simple (Fig. 99). Hind femora of the males from the oriental region are not modified except for *B. puangensis*, in which they are swollen basally and excised medially on the undersurface (Figs. 101, 102).

o) Male genitalia. Some parts are variable among individuals of the same species and some quite similar in general among the different species. Some parts, however, provide useful specific characters. The form of the dorsal part of the penis valve is a useful character in separating the species, and some terminology is introduced and illustrations are provided to explain the different forms of the penis valve (Figs. 26, 27). The mid-lateral flange of the penis valve (MLF) is a lateral expansion (measured at its greatest width) between the anterior projection (AP) and the posterior projection (PP). The dorso-lateral gap (DLG) is the space between the base of the mid-lateral flange and the apex of the posterior projection of the penis valve. The width of the gap is useful in differentiating some species and appears to be consistent within species. The mid-lateral flange of the penis valve may be broad in some species as in Figures 52, 55 and 60 or entirely absent as in *B. breviceps* (Fig. 7). The ventro-apical plate of the gonocoxite has a number of teeth or peglike projections. The ventro-apical plates (VAP) can be symmetrical or asymmetrical; that is, both the right and left plates have the same number of peglike processes or one plate has fewer peglike processes than the other. The number of peglike processes is quite variable even in individuals found in the same nest, i.e., *B. hewitti* (see below). As in the Australian species, the roof of the genital chamber is wrinkled in all the specimens examined; no oriental species were found having a smooth surface as do some African species (Michener, 1975a). Because examination of genitalia requires dissection, they have not been examined for every male specimen; the number of genitalic dissections is indicated in the descriptions, e.g. (n = 4).

KEY TO FEMALES OF ORIENTAL *BRAUNSAPIIS*

1. T6 scoop-shaped (Fig. 103); mouthparts reduced (Figs. 3, 4); scopa reduced (Fig. 5). 2
- T6 rounded (Fig. 104); mouthparts normal (Figs. 1, 2); scopa developed (Fig. 6) 3
2. Pronotal collar with yellow mark; tarsi yellow; India *kaliago*
- Pronotal collar without yellow mark; tarsi dark; Indonesia, Malaysia *breviceps*
3. Head as long as broad 4
- Head broader than long 5
4. Clypeus largely black, clypeal mark T-shaped (Fig. 98); scopa with patch of dark hairs distally on outer surface of tibia; legs black; head width 1.61 mm; India *indica*
- Clypeus partly black below, clypeal mark narrowed toward apex (Fig. 96); scopa with silvery hairs; legs orange; head width 1.23 mm; Vietnam *aurantipes*
5. Paraocular mark present 6
- Paraocular mark absent (or a scarcely noticeable fleck) 9
6. Clypeus partly black below, clypeal mark narrowed toward apex (Figs. 88, 89) 7
- Clypeus entirely yellow (Figs. 77, 86) 8
7. Clypeus partly black on upper half, clypeal mark slender on lower half, T-shaped, central yellow area smaller than black lateral areas; head width 1.70–1.87 mm; Malaysia, Indonesia *lateralis*
- Clypeus mostly yellow on upper half, clypeal mark broader on lower half, central yellow area larger than black lateral areas; head width 1.47–1.67 mm; Malaysia, Indonesia *apicalis*
8. Scape black underneath; head width 1.63–1.70 mm; longer hairs on T4–6 light brown to fuscous; Malaysia, Indonesia, Philippines *palavanica*
- Scape yellow underneath; head width 1.32–1.50 mm; longer hairs on T4–6 transparent; Thailand, Malaysia, Singapore, Indonesia, Philippines *clarihirta*
9. Metasomal terga mostly yellow; Sri Lanka, Thailand, Burma, Malaysia *flaviventris*
- Metasomal terga black or nearly so 10
10. Clypeus entirely yellow; labrum yellow to fusco-ferrugineous 11
- Clypeus partly black below, clypeal mark narrowed toward apex; labrum fusco-ferrugineous to black 13
11. Tibia and tarsus orange; India *malliki*
- Tibia and tarsus reddish brown to black 12
12. Longer hairs on T4–6 simple, tapering as in Figure 105; head width/length ratio 1.05–1.09; Vietnam, Burma, Thailand, Malaysia, Singapore, Indonesia, Philippines *cupulifera*
- Longer hairs on T4–6 blunt to spiculate as in Figures 106, 107; head width/length ratio 1.09–1.16; Taiwan, Vietnam, Laos, Thailand, Malaysia, Indonesia, Philippines *hewitti*
13. Mandible yellow or with large yellow mark 14
- Mandible fusco-ferrugineous to black 16
14. Clypeus largely black, clypeal mark T-shaped (Fig. 90); longer hairs on T4–6 transparent; Malaysia, Indonesia, Philippines *reducta*
- Clypeus partly black below, clypeal mark narrowed toward apex (Figs. 92, 94); longer hairs on T4–6 light brown to fuscous 15
15. Head width 1.47–1.70 mm; outer surface of scopa with patch of golden hairs; Philippines *reversa*
- Head width 1.69–1.91 mm; outer surface of scopa with patch of dark brown hairs; Philippines *signata*
16. Head width 1.83–2.00 mm; hairs on T4–6 light brown to fuscous; Vietnam, Laos, Thailand, Malaysia, Singapore, Indonesia, Philippines *philippinensis*

- Head width 1.73 mm or less; hairs on T4-6 transparent to partly fuscous 17
- 17. Head width 1.20-1.57 mm 18
- Head width 1.60-1.73 mm; Pakistan, India, Sri Lanka, Laccadive Arch. *pictitarsis*
- 18. Clypeus largely black below, clypeal mark strongly narrowed to a point (Fig. 81); head width/length ratio 1.06-1.11; India, Nepal, Vietnam, Laos, Thailand, Malaysia, Hong Kong, Indonesia *puangensis*
- Clypeus partly black below, clypeal mark narrowed toward apex (Fig. 65); head width/length ratio 1.14-1.18; Pakistan, India, Sri Lanka *mixta*

KEY TO MALES OF ORIENTAL *BRAUNSAPI*S

(Males are unknown for *B. flaviventris*, *B. malliki*, *B. apicalis*, *B. lateralis* and *B. indica*)

- 1. Head broad, 1.24-1.29 times broader than long; mouthparts reduced (as in Figs. 3, 4) 2
- Head less broad, 1.24 times or less broader than long; mouthparts normal (as in Figs. 1, 2) 3
- 2. Paraocular mark reduced or absent; S8 without upturned spiculum (Fig. 9); penis valve without mid-lateral flange (Fig. 8); gonostylus with single long seta (Fig. 8); Indonesia, Malaysia *breviceps*
- Paraocular mark present; S8 with short upturned spiculum as in Figure 16; penis valve with reduced mid-lateral flange (Fig. 12); gonostylus with three setae (Fig. 13); India *kaliago*
- 3. Hind femur swollen basally, emarginate medially (Figs. 101, 102); India, Nepal, Vietnam, Laos, Thailand, Malaysia, Hong Kong, Indonesia *puangensis*
- Hind femur at most slightly swollen basally, not emarginate medially (Fig. 99) 4
- 4. Hind trochanter lobed distally and excised medially (Fig. 100); mandible yellow 5
- Hind trochanter simple (Fig. 99); mandible black 10
- 5. Head width 1.21-1.43 mm; head width/length ratio 1.04-1.09 6
- Head width 1.47-1.91 mm; head width/length ratio 1.11-1.19 7
- 6. Legs orange; Vietnam *aurantipes*
- Legs fusco-ferruginous to black except tarsi yellow; Vietnam, Burma, Thailand, Malaysia, Singapore, Indonesia, Philippines *cupulifera*
- 7. Paraocular mark present 8
- Paraocular mark absent 9
- 8. Vento-apical plate of gonocoxite with sunken peglike processes (Fig. 50); head width/length ratio 1.16-1.22; Malaysia, Indonesia, Philippines *reducta*
- Vento-apical plate of gonocoxite with peglike processes not sunken (Fig. 42); head width/length ratio 1.12-1.16; Thailand, Malaysia, Singapore, Indonesia, Philippines *clarihirta*
- 9. Head width 1.47-1.57 mm; head width/length ratio 1.20-1.24; Philippines *reversa*
- Head width 1.60 mm; head width/length ratio 1.15; Philippines *signata*
- 10. Paraocular mark absent; head width 1.80-1.97 mm; Vietnam, Laos, Thailand, Malaysia, Singapore, Indonesia, Philippines *philippinensis*
- Paraocular mark present; head width less than 1.80 mm 11
- 11. Longer hairs on T4-6 fuscous; Malaysia, Indonesia, Philippines *palavanica*
- Longer hairs on T4-6 transparent to light brown 12
- 12. Mandible black, sometimes with yellow spot; head width 1.23-1.67 mm; head width/length ratio 1.12-1.19 13
- Mandible yellow; head width 1.60-1.73 mm; head width/length ratio 1.12-1.14; Pakistan, India, Sri Lanka, Laccadive Arch. *pictitarsis*
- 13. Longer hairs on T4-6 blunt to spiculate; head width 1.23-1.47 mm; Pakistan, India, Sri Lanka *mixta*

- Longer hairs on T4-6 simple to blunt; head width 1.27-1.67 mm; Taiwan, Vietnam, Laos, Thailand, Malaysia, Indonesia, Philippines. *hewitti*

THE *BREVICEPS* SPECIES GROUP

The species of this group are social parasites in the nests of other species of *Braunsapis* (Michener, 1966, 1970; Reyes and Michener, 1990). No other oriental species are parasitic so far as known.

The members of this species group are recognized largely by the characters associated with parasitism. This includes reduction of the scopa (Fig. 5) and the mouthparts (Figs. 3, 4), also the short head and the glossy or at most very finely punctured face and the scoop-shaped T6 (Fig. 103). The first two characters are convergent among parasitic species in other areas and therefore not good indicators of close phylogenetic relationships. The mouthparts of *B. breviceps* and *B. kaliago* (Figs. 3, 4) differ from those of non-parasitic species as follows: the maxillary palpus is 4-segmented (6-segmented in non-parasitic species), the second segment of the labial palpus is about as long as the third and fourth segments combined (sometimes over twice as long as the third and fourth combined in non-parasitic species), the galea is shorter than the stipes (about 1.5 times as long as stipes in non-parasitic species), and the glossa is about as long as the stipes (about twice as long as the stipes in non-parasitic species). The recognition of this species group could seem arbitrary, but the two species resemble one another in nearly all other characters and are no doubt close relatives. Furthermore, the males have the mid-lateral flange of the penis valve either reduced as in *B. kaliago* (Fig. 12) or absent as in *B. breviceps* (Fig. 7).

The species group is most closely related to the *mixta* species group and shares with it the following characters: the females have relatively broad heads (broader than in other non-parasitic species) and the males have simple trochanters and femora as in Figure 98.

Braunsapis breviceps (Cockerell)

Allodape breviceps Cockerell, 1920b: 623. Type: female, Penang Is., Malaysia (NMNH).

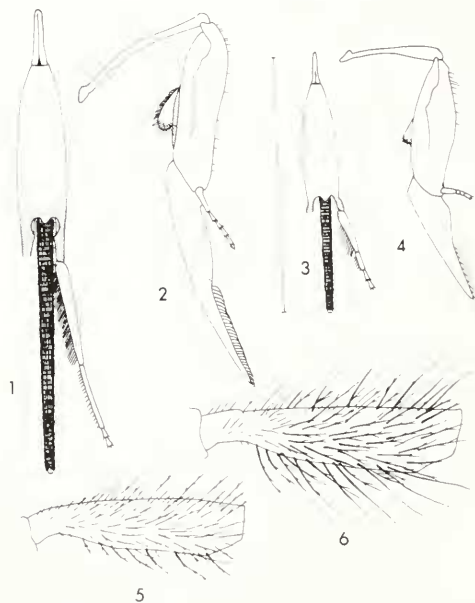
Allodapula breviceps: Michener, 1966a: 705; 1970.

Braunsapis breviceps: Reyes and Michener, 1990.

Female. Face as in Figure 61. (1) Length 5.1-5.7 mm. (2) Labrum ferrugino-testaceous, mandible fusco-ferrugineous. (3) Clypeus entirely yellow, color sometimes reduced near apex. (4) Paraocular mark absent. (*) Scape yellow underneath. (6) Tegula transparent, axillary sclerites yellow or mixed. (7) HW 1.27-1.43 mm (1.43 mm). (8) HW/HL ratio 1.21-1.24 (1.23). (10)

Middle of epistomal suture slightly raised. (11) Scape reaching front ocellus. (12) Basitibial plate with carina indistinct. (13) Hairs on T4-5 transparent; longer hairs suberect, blunt, longer than width of scape; shorter hairs subprostrate, spiculate. (*) T6 scoop-shaped, lateral margin produced into slightly elevated shoulder, tip blunt and short, slightly curved upward (Fig. 102).

Male. Face as in Figure 62. (14) Length 4.2-4.5 mm. (15) Labrum yellow, mandible fusco-ferrugineous. (16) Clypeus entirely yellow. (17) Paraocular mark reduced, sometimes just a small spot. (*) Scape yellow underneath. (18) HW 1.33-1.40 mm. (19) HW/HL ratio 1.24-1.27. (20) Hind trochanter simple. (21) Hairs on T4-6 transparent to light brown; longer hairs suberect, blunt, longer than width of scape; shorter hairs subprostrate to slanting, simple. (22) Genitalia (n=4) as in Figures 7-11; gonostylus rounded apically, with one long seta (Fig. 8); ventro-apical plate of gonocoxite either symmetrical or asymmetrical; right ventro-apical plate with 2 peglike processes and left with 3 peglike processes or both plates with 2 peglike processes (Fig. 10); penis valve with the mid-lateral flange absent (Fig. 8); S8 without upturned spiculum (Fig. 9); roof of genital chamber wrinkled (Fig. 11).



Figures 1-4. Mouthparts: labium and maxilla of female *Braunsapis* from Central Java, Indonesia. Figs. 1, 2. *B. hewitti*. Figs. 3, 4. *B. breviceps*.

Figures 5, 6. Scopa of female *Braunsapis* (redrawn from Michener, 1966). Fig. 5. *B. breviceps*. Fig. 6. *B. simillima* (Smith).

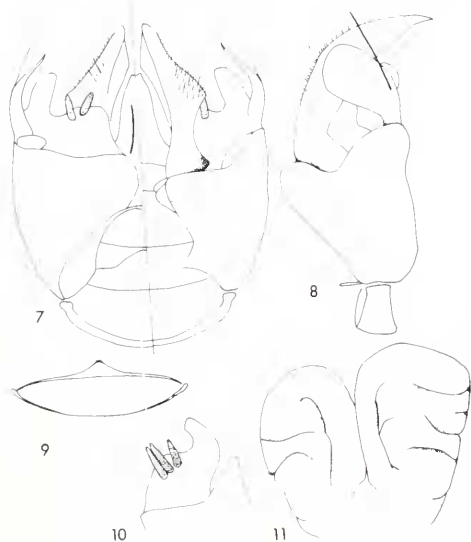
Specimens examined. **Indonesia.** 9 females and 7 males, Boyolali, Central Java, 10–23.v.1973, C.D. Michener (SMUK); 1 male, Bogor, West Java, 15.v.73, C.D. Michener (SMUK); 1 female, Flores, 10–16.vi.27, S.G. Rensch (Berlin). **Malaysia.** 2 females, 1 male, Georgetown, Penang Is., 4.vi.73, C.D. Michener (SMUK); 3 females, 2 males, Ampang, E. of Kuala Lumpur, 3.vi.73, C.D. Michener (SMUK); 1 female (holotype), Penang Is., Baker (NMNH).

Remarks. This is the only Asiatic species that was recognized by Michener (1966a) as parasitic on the basis of adult morphology. This species is quite similar to *B. kaliago*. They are separated by the following characters: the females of *B. breviceps* do not have a yellow mark on the pronotal collar and the tarsi are reddish brown to black; the males lack the mid-lateral flange of the penis valve (Fig. 7), the gonostylus has a single long seta (Fig. 8), S8 does not have an upturned spiculum (Fig. 9), and the paraocular marks are either reduced or absent (Fig. 62).

Biological observations on this species are reported by Reyes and Michener (1990). All specimens taken by Michener were from nests of *B. hewitti* and *B. puangensis*. No specimens of *B. breviceps* were taken on flowers.

Braunsapis kaliago Reyes and Sakagami

Braunsapis kaliago Reyes and Sakagami, 1990: 458.
Type: male, Mehruli near Delhi, India (SMUK).



Figures 7–11. Male genitalia of *B. breviceps*, Boyolali, Central Java, Indonesia. Fig. 7. Dorsal (right) and ventral (left) view of male genitalia. Fig. 8. Same, lateral view. Fig. 9. S7 and S8. Fig. 10. Right ventro-apical plate of gonocoxite. Fig. 11. Roof of genital chamber, dorsal view.

Female. Face as in Figure 63. (1) Length 5.3–6.0 mm (5.3 mm). (2) Labrum ferruginotestaceous, mandible black. (3) Clypeus partly black below, clypeal mark narrowed toward apex. (*) Scape with yellowish mark underneath. (6) Tegula transparent with yellow spot mesally, axillary sclerites yellow. (7) HW 1.33–1.37 mm (1.37 mm). (8) HW/HL ratio 1.28. (11) Scape not reaching front ocellus. (13) Hairs on T4–5 transparent; longer hairs suberect, slightly spiculate at tips, three times longer than width of scape; shorter hairs subprostrate, weakly spiculate. (*) T6 scoop-shaped as in *B. breviceps*.

Male. Face as in Figure 64. (14) Length 5.0 mm. (15) LabrumT (Yellow, mandible yellow at tip. (17) Paraocular mark present. (18) HW 1.33 mm. (19) HW/HL ratio 1.29. (21) Hairs on T4–6 transparent; longer hairs suberect, slightly spiculate at tips, one and a half times longer than width of scape, shorter hairs subprostrate, weakly spiculate. (22) Genitalia as in Figures 12, 13; ventro-apical plate of gonocoxite with pair of peglike projections (Fig. 12); penis valve with mid-lateral flange reduced, small (Fig. 12); gonostylus slightly narrowing toward apex, with three setae (Fig. 13); S8 with strong upturned spiculum as in Figure 16.

Specimens examined. **India.** 1 female, 1 male (holotype), Mehruli, Delhi, 6–8.iii.88, L.R. Batra and S.W.T. Batra (SMUK); 1 female, same data except (Hokkaido); 1 female, Hissar (Bee Shelter), 4.iv.84, F.B. Parker (USUL).

Remarks. *B. kaliago* is quite similar to *B. breviceps*, but differs from it by the following characters: the females have a pair of yellowish spots on the pronotum and the tarsi are entirely yellow; the males have a yellow paraocular mark, S8 has an upturned spiculum, the penis valve has reduced mid-lateral flange (Fig. 12) and the gonostylus has three setae (Fig. 13).

THE MIXTA SPECIES GROUP

The males of this species group have simple hind trochanters and femora (Fig. 99) and the females have more or less broad heads. The mid-dorsal part of the penis valve of the males appears quadrate when viewed from above and the mid-lateral flange is usually rounded on its posterior margin (Figs. 22, 26, 31). The ventro-apical plate of the gonocoxite has the mesal process less developed (Figs. 18–20) in contrast to that of the *puangensis* species group. The simple trochanter and the genitalic features above may represent an ancestral state compared to those of the *cupulifera* species group (see below).

The females of *B. mixta*, *B. picitarsis* and *B. philippinensis* have the clypeus partly black below with the clypeal mark narrowed toward the apex (Figs. 67, 69, 71). The females of *B. hewitti*, *B. flaviventris* and *B. malliki*, on the other hand, have

the clypeus entirely yellow (Figs. 73, 76, 80). In addition to the yellow clypeus, the females of *B. palavanica* have paraocular marks (Fig. 77).

Braunsapis mixta (Smith)

Prosopis mixtus Smith, 1852: 50. Type: female, India (BMNH); Meade-Waldo, 1923: 24 (placed under *Allodape*).

Allodape marginata Smith, 1854: 230. Type: female, "East Indies?" (BMNH) (**New synonymy**).

Allodape parvula Smith, 1879: 98. Type: female, Bombay, India (BMNH) (**New synonymy**).

Prosopis leucotarsis Cameron, 1897. Type: female, Ceylon; Cockerell, 1921: 363 (placed under *Allodape*); Meade-Waldo, 1923: 24 (placed as synonym of *A. mixta*).

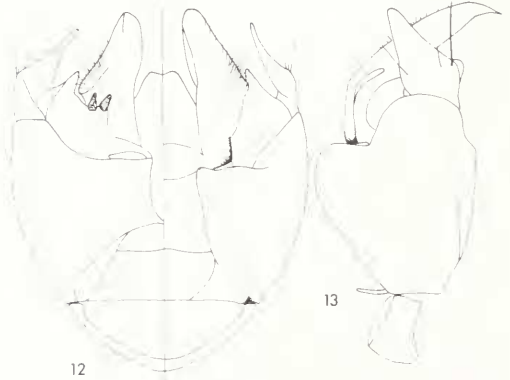
Allodape pumilio Cockerell, 1911: 182. Type: female, Karachi, N.W. India (= Pakistan) (BMNH) (**New synonymy**).

Female. Face as in Figure 65. (1) Length 3.8–6.1 mm. (2) Labrum black, sometimes with small yellow spot, mandible black. (3) Clypeus partly black below, sometimes mostly yellow. (4) Paraocular mark absent. (*) Scape with small yellow mark underneath, sometimes absent. (6) Tegula transparent, axillary sclerites yellow. (7) HW 1.23–1.57 mm (1.43 mm). (8) HW/HL ratio 1.14–1.18 (1.14). (10) Middle of epistomal suture slightly raised. (11) Scape not or barely reaching front ocellus. (12) Basitibial plate with carina indistinct. (13) Hairs on T4–6 transparent, longer hairs slanting, spiculate; shorter hairs subprostrate, spiculate (Fig. 107).

Male. Face as in Figure 66. (14) Length 3.6–4.9 mm. (15) Labrum yellow to fusco-ferrugineous, mandible black. (16) Clypeus entirely yellow. (17) Paraocular mark present, sometimes reduced. (*) Scape with yellow mark underneath, sometimes reduced. (18) HW 1.23–1.47 mm. (19) HW/HL ratio 1.14–1.19. (20) Hind trochanter simple. (21) Hairs on T4–6 transparent; longer hairs slanting to suberect, blunt to spiculate; shorter hairs prostrate, spiculate. (22) Genitalia ($n=5$) as in Figures 14–20; gonostylus tapering toward apex, with one short seta (Fig. 15); ventro-apical plate of gonocoxite asymmetrical, right plate with 2 or 3 peglike processes, left plate with 3 or 4 peglike processes (Figs. 18–20); penis valve with mid-lateral flange narrowed and with rounded posterior margin, dorso-lateral gap narrow, gap about twice as long as the mid-lateral flange (Fig. 14); S7 and S8 as in Figure 16; roof of genital chamber wrinkled (Fig. 17).

Specimens examined. **Pakistan.** 2 females (including holotype of *A. pumilio*), Karachi (BMNH); 5 females, 1 male, Karachi, 22.vi.71, M.T (TShadab (AMNH)); 27 females, 4 males, Sind, Karachi, 26.vii–25.viii.72, M. Shadab (AMNH); 3 females, 1 male, same data except (SMUK); 2 females, Hyderabad, 5.viii.72, M. Shadab (AMNH); 3 females, Lasbella Prov., 8 km S. of Bella, 27.iii.65, J.W. Neal (NMNH); 2 females, Lahore (= West Punjab), 19.iv.08, G.R.

Dutt (Delhi). **India.** 2 females (including lecto-type) (BMNH); 9 females, Bankipur, Bengal, 25.x.11, T.B.F. (Delhi); 1 female, 1 male, Pusa, Bengal (= Bihar), 21.v–x.07, G.R. Dutt (Delhi); 1 male, Pusa, Bengal (= Bihar), 11.ix.08, T.N.T. (Delhi); 1 female, Vengurla, Maharashtra, 25.viii.83, B. Mallik (Bangalore); 3 females, V.C. Farm, Madaya, 10.viii.82, B. Mallik (Bangalore); 17 females, 3 males, Poona (= Pune), W. India, 3.ix.66–1975 (Oxford); 1 male, Poona, xi.67, F.L. Wain (SMUK); 18 females, 1 male, Lonaula, W. Ghats, W. India, 7.xi.61–28.v.76 (Oxford); 22 females, 1 male, Lonaula, W. Ghats, 17–18.v.63, F.L. Wain (Hokkaido); 2 females, Kakay, W. Ghats, 14.ii.63, F.L. Wain (Hokkaido); 1 female, Keukau Matteirau, W. India, 22.xii.65 (Oxford); 2 females, Kerala Alwaye, S. India, 11.iii.70 (Oxford); 1 female, Punjab Agri. College, Ludhiana Campus, Punjab, 28.ix.64, S.W.T. Batra (SMUK); 12 females, Cholasahib Vill., Amritsar Dist., Punjab, 5.x.64–27.iv.65, S.W.T. Batra (SMUK); 1 female, Hissar, Punjab, 28.ii.65, S.W.T. Batra (SMUK); 7 females, Chandigarh, Punjab, 17.iv.65, S.W.T. Batra (SMUK); 1 female, Kakanakote Forest Sta., Mysore, 8.i.65, S.W.T. Batra (SMUK); 2 females, Chandigarh, Punjab, 17.iv.65, S.W.T. Batra (MCZ); 1 male, Tanjore, 28.x, P.S. Nathan (MCZ); 1 female, Karakal, Tanjore, ix.51, P.S. Nathan (NMNH); 2 females (including holotype of *A. parvula*), Bombay (NMNH); 1 female, Lonavia, 2000 ft., Bombay, 16.v.59, F.L. Wain (SMUK); 2 females, Delhi, 25.xii.64 (SMUK); 1 female, 1 male, Coimbatore, Madras (= Tamil Nadu), 30.iii.78 (Hokkaido); 1 female, Coimbatore, Madras (= Tamil Nadu), ix.64, P.S. Nathan (SMUK); 1 female, Coimbatore, Madras (= Tamil Nadu), 11.vii.49, P.S. Nathan (NMNH); 5 females, 2 males, 10–15 km N.W. of Udagamandalam (= Ooty), 1500–2000 m,



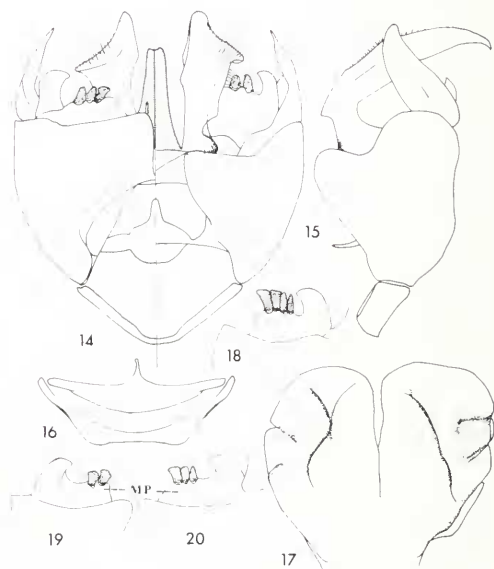
Figures 12, 13. Male genitalia of *B. kaliago* (holotype), Mehruli, Delhi, India. Fig. 12. Dorsal (right) and ventral (left) view of male genitalia. Fig. 13. Same, lateral view.

Tamil Nadu State, 17.viii.90, C.D. Michener (SMUK); 37 females, 3 males, Mudumalai Wildlife Sanctuary, 1000–1200 m, 30 km N.W. of Udagamandalam (=Ooty), Tamil Nadu State, 13–16.viii.90, C.D. Michener (SMUK); 2 females, Mudumalai Preserve, 1100 m, 30 km N.W. of Udagamandalam (=Ooty), Tamil Nadu State, 16.viii.90, C.D. Michener (SMUK); 2 females, Mudumalai Preserve, 5 km S. of Theppakadu, Tamil Nadu State, 13.viii.90, W.T. Wcislo (SMUK); 35 females, 1 male, Madras, x.73, I. Kudo (Hokkaido); 10 females, 1 male, same except (SMUK); 3 females, Adyar, Madras (=Tamil Nadu), 12.viii.73, I. Kudo (Hokkaido); 5 females, City Park, Madras, 19.viii.73, I. Kudo (Hokkaido); 1 female, Calcutta, 14.iv.72, T. Matsumura (Hokkaido); 1 female, Calcutta, 24.i.78 (Hokkaido); 1 female, 4 males, Calcutta and Rungtong, 28.i–1.ii.1897 (CN); 1 female, Lam-poon, 25.ii.58 (Hokkaido); 2 females, 3 males, Mehruli, Delhi, 6–8.iii.88, L.R. Batra and S.W.T. Batra (Hokkaido); 1 female, Delhi, x.58, N.L.H. Krauss (NMNH); 1 female, Mormugao, Goa, vi.25, J.C. Bridwell (NMNH); 2 females, Goa, 26–27.xi.27, H. Schmidt (Berlin); 1 female, Bulandshahr, 15.iii.07, Bingham (Berlin); 4 females, Deesa (NMNH); 14 females, 2 males, Deesa (BMNH); 1 female, Dacca, 22.viii.45, D. Leston (BMNH); 2 males, Dohnavur, Tinnevely District, 10.x.38 (BMNH); 1 female, Burrak-pore, 31.i.78 (Hokkaido); 1 female, 1 male, Belgaum, Bombay Prov. (=Karnataka), 2500 ft., 10.viii.10, T.B.F. (Delhi); 10 females, 3 males, Ullal, Cashew Res. Stn., Mangalore, Karnataka State, 18–28.viii.83, B. Mallik (Bangalore); 7 females, 1 male, 12 km N. of Yelburga, Karnataka State, 23–27.xi.80, K.D. Ghorpade (ZM); 3 females, Bangalore, Karnataka State, 2.i.65, S.W.T. Batra (SMUK); 6 females, Bangalore, 1000 m, Karnataka State, 10–19.viii.90, C.D. Michener (SMUK); 5 females, 2 males, Bangalore, Karnataka State, 18.ii.77–30.iii.80, K.D. Ghorpade (ZM); 1 female, 1 male, Bangalore, Karnataka State, 25.iv.78–7.23.v.80 (ZM); 2 females, Bannerghatta, Bangalore, Karnataka State, 27–31.x.77, Zool. Mus. Copenhagen Exp. (ZM). **Sri Lanka.** 28 females, 12 males, Colombo, iii.57, Perera (SMUK); 11 females, 4 males, Yakkala Estate, 20 mi. N.E. of Colombo, Western Province, 5–10.viii.59, R.L.A. Perera (SMUK); 4 females, 1 male, Mediriginya, North Central Province, 21–27.iii.58, R.L.A. Perera (SMUK); 2 females, Hiniduma, Southern Province, 20–28.ii.58, R.L.A. Perera (SMUK); 6 females, 3 males, Gampaha Botanic Garden, Colombo Dist., 28.i.79, K.V. Krombein, P.B. Karunaratne, T. Wijesinha, S. Siriwardane, T. Gunawardane (NMNH).

Remarks. The type of *Allodape leucotarsis* from Sri Lanka could not be located. Based on the description of Cameron (1897), it appears similar to *B. mixta* in size, clypeal marking and color of scopa.

Meade-Waldo (1923) first proposed the synonymy and is followed in this paper. The type of *Allodape marginata* is similar to *B. mixta* in having the same clypeal marking, transparent tegula, yellow axillary sclerites, transparent and weakly spiculate longer hairs on T4–6. The type of *Allodape parvula* is headless but every preserved character such as the form and color of metasomal hairs on T4–6, color of tegula, basitibial carina and scopa is the same as *B. mixta*. The type of *Allodape pumilio* has a smaller head width (1.30 mm) compared to the type of *B. mixta* (1.43 mm) but is otherwise similar to the latter. The cotype (=paratype) of *A. pumilio* is headless but also similar in other body characters to *B. mixta*. All are within the range of variation found in other specimens that I attribute to *B. mixta*.

Sympatric populations of *B. mixta* and *B. picitarsis* occur in India, Pakistan and Sri Lanka. *B. mixta* is distinguished from *B. picitarsis* by its relatively small size; the head is broader (HW/HL ratio 1.14–1.18 in females) compared to most oriental species and the hairs on T4–6 are slanting and spiculate. The male is separated from



Figures 14–20. Male genitalia of *B. mixta*, Mehruli, Delhi, India. Fig. 14. Dorsal (right) and ventral (left) view of male genitalia. Fig. 15. Same, lateral view. Fig. 16. S7 and S8. Fig. 17. Roof of genital chamber, dorsal view. Fig. 18. Left ventro-apical plate of gonocoxite, male from Mehruli, India. Figs. 19, 20. Ventro-apical plates of the gonocoxites, left and right plates, respectively, from Colombo, Sri Lanka. MP, mesal process of ventro-apical plate.

B. pictaris by its broader head (HW/HL ratio 1.14–1.19) and smaller size as indicated by the head width (1.23–1.43 mm). Eleven females from Madras have the clypeus mostly yellow. Six females from Sind, Pakistan, three from Lonaula, W. Ghats and eight from Sri Lanka have the scape yellow underneath.

Braunsapis pictaris (Cameron)

Allodape pictaris Cameron, 1902: 60. Type: female, Minikoi Is., Laccadive Arch. (BMNH).

Female. Face as in Figure 67. (1) Length 5.8–7.7 mm. (2) Labrum and mandible black. (*) Scape yellow underneath. (7) HW 1.53–1.80 mm (1.67 mm). (8) HW/HL ratio 1.09–1.14 (1.09). (10) Middle of epistomal suture raised. (11) Scape reaching front ocellus. (12) Basitibial plate indicated by weak carina. (13) Hairs on T4–6 transparent to light brown; longer hairs slanting to suberect, simple to weakly spiculate; shorter hairs subprostrate, simple.

Male. Face as in Figure 68. (14) Length 5.2–5.8 mm. (15) Labrum yellow, mandible black. (17) Paraocular mark present, sometimes reduced or absent. (*) Scape yellow underneath. (18) HW 1.60–1.77 mm. (19) HW/HL ratio 1.12–1.14. (21) Hairs on T4–6 transparent to light brown; longer hairs suberect, simple; shorter hairs subprostrate, simple. (22) Genitalia (n=3) as in Figures 21–23, ventro-apical plate of gonocoxite with 3 peglike processes (Fig. 21); penis valve with mid-lateral flange broad, posterior margin quadrate as seen dorsally, dorso-lateral gap about as wide as mid-lateral flange (Fig. 22); gonostylus longer than broad, with one small seta (Fig. 23).

Specimens examined. **Pakistan.** 3 females, Lasbella Prov., 8 km S. of Bella, 27.iii.65, J.W. Neal (NMNH). **India.** 4 females. Karikal, Pondicherry State, ii.64, P.S. Nathan (SMUK); 2 females, Chandigarh, Punjab, 17.iv.65, S.W.T. Batra (SMUK); 1 female, Saproon, 5000 ft., Punjab, 16.iv.65, S.W.T. Batra (SMUK); 2 females, Mussoorie Kenty Falls, 4000 ft., Uttar Pradesh, 16.x.64–25.vi.65, S.W.T. Batra (SMUK); 1 female, Bombay, Maharashtra, 11–15.iii.17, G.R. Dutt (Delhi); 1 female, Pusa, Bengal (= Bihar), 18.ix.08, R.D.D. (Delhi); 1 female, Pusa, Bihar, 28.iv.15, Boy Coll. (Delhi); 1 male, Palnis, Kodaikanal, Tamil Nadu, x.21, Fletcher Coll. (Delhi); 41 females, 2 males, Coimbatore, 1400 ft., Tamil Nadu, ix.64–xi.65, P.S. Nathan (SMUK); 1 female, Mudumalai Wildlife Sanctuary, 1200 m, 30 km N.W. of Udagamandalam (= Ooty), Tamil Nadu State, 16.viii.90, C.D. Michener (SMUK); 1 female, Mudumalai Preserve, Center for Ecological Studies, 4.viii.90, C.D. Michener (SMUK); 1 female, Coimbatore, 1400 ft., Tamil Nadu, xi.65, P.S. Nathan (NMNH); 1 female, Poonmudi Range, 3000 ft., Trivandrum District, Kerala State, v.72, T.R.S. Nathan (SMUK); 1 female, City Park,

Madras, 19.viii.73, 1. Kudo (Hokkaido); 1 female, 1 male, Belgaum, Bombay Prov. (= Karnataka), 10.viii.10, T.B.F. (Delhi); 4 females, Ullal, Cashew Res. Stn., Mangalore, Karnataka, 18–28.vii.83, B. Mallik (Bangalore); 1 female, Nagarhole, Mysore, Karnataka, 4.ix.82, B. Mallik (Bangalore); 2 females, Bangalore, Karnataka State, 2.i.65, S.W.T. Batra (SMUK); 1 female, Bangalore, Karnataka State, 26.i.78, 1 Kudo (Hokkaido); 1 female, Bangalore, 1000 m, Karnataka State, 18–19.viii.90, C.D. Michener (SMUK); 4 females, 1 male, Nedungadw, Tanjore, 1–2.vi, P.S. Nathan (MCZ); 4 females, 1 male, Poona (= Pune), 16.viii.66–21.X.74 (Oxford); 1 female, Ranchi, iv.57, G. Pingalet (NMNH); 2 females, Calcutta, 1.ii.1897 (CN); 1 female, Bandra, Jayakar (BMNH). **Sri Lanka.** 9 females, Colombo, iii.57, R.L.A. Perera (SMUK); 4 females, 1 male, Medirigaya, North Central Province, 21–27.iii.58, R.L.A. Perera (SMUK); 1 female, 1 male, Yakkala Estate 20 mi. N.E. of Colombo, Western Province, 5–10.viii.59, R.L.A. Perera (SMUK); 1 male, Galkissa 7 mi. S. of Colombo, Western Province, 4.v.59, R.L.A. Perera (SMUK); 1 female, Kullupitiya, Colombo District, 6.xi.78, G. Ratynaweera (NMNH); 1 female, Colombo, 22.viii.58 (Oxford). **Laccadive Arch.** 8 females (including lectotype), 2 males, Minikoi Is., 20.vi.00, J.S. Gardiner (BMNH); 1 female, 1 male, Feridhu Is., 4°3'N 72°42'W, Maldive Is., 5.x.88, P.S. Kevan (SMUK); 2 females, Aridhu Is., 3°30'N 72°51'W, 30.ix.88, P. Kevan (SMUK); 1 female, North Male Atoll, Maldive Is., 26.i.57, W.W.A. Phillips (BMNH).

Remarks. The female of *B. pictaris* is quite similar to that of *B. mixta*, especially in the facial marking (Figs. 65, 67). However, the head of the former (HW/HL ratio 1.09–1.14) is narrower than that of *B. mixta* and also larger (at least in those populations found in Sri Lanka and India, head width 1.60–1.73 mm). The males are quite similar to those of *B. mixta* and *B. hewitti* but differ from these two species by their larger size (Fig. 68) and yellow mandibles.

Braunsapis philippinensis (Ashmead)

Prosopis philippinensis Ashmead, 1904: 5. Type, female, Manila, Luzon, Philippines (NMNH); Cockerell, 1916: 302 (placed under *Allodape*); 1919: 191.

Allodape mindanaonis (Cockerell), 1915: 109. Type: female, Dapitan, Zamboanga, Mindanao, Philippines (NMNH) (**New synonymy**).

Allodape marginata pictaris Cameron: Cockerell, 1916: 302 (distr. Philippines) (misidentification).

Female. Face as in Figures 69, 71. (1) Length 6.1–8.2 mm. (2) Labrum and mandible black. (3) Clypeus partly black, sometimes clypeal mark T-shaped. (6) Tegula transparent, sometimes slightly infuscated, axillary sclerites yellow or mixed. (7) HW 1.73–200 mm (1.97 mm). (8) HW/HL ratio 1.11–1.14 (1.14). (10) Middle of

epistomal suture raised. (11) Scape reaching front ocellus. (13) Hairs on T4-6 light brown to fuscous; longer hairs slanting, blunt to spiculate; shorter hairs substrate, spiculate.

Male. Face as in Figures 70, 72. (14) Length 5.6-7.3 mm. (15) Labrum yellow, sometimes reduced, mandible black. (16) Clypeus partly black, clypeal mark sometimes reduced to longitudinal mark. (17) Paraocular mark present, reduced or absent. (18) HW 1.77-1.97 mm. (19) HW/HL ratio 1.11-1.15. (*) Tarsi dark. (21) Hairs on T4-6 fuscous; longer hairs slanting to suberect, blunt; shorter hairs substrate, weakly spiculate. (22) Genitalia (n=8) as in Figures 24-28; ventro-apical plates of gonocoxite asymmetrical, right plate with 3-4 peglike processes and left plate with 4-6 peglike processes (Figs. 24, 25); penis valve with mid-lateral flange wider than in *B. mixta* with posterior margin rounded, dorso-lateral gap narrow, slightly less than the width of mid-lateral flange (Figs. 26, 27); gonostylus longer than broad, with one to two setae (Fig. 28).

Specimens examined. **Vietnam.** 7 females, Dai Lanh N. of Nha Trang, 30.xi-5.xii.60, C.M. Yoshimoto (Bishop). **Laos.** 2 females, 1 male, Wapi, Wapikhamthong Prov., 15.x.67 (Bishop); 1 female, Tha Ngone, Vientiane Prov., 6.ix.65 (Bishop); 2 females, Ban Van Euc, Vientiane Prov., 13.iv.65, J.L. Gressitt (Bishop); 1 female, Phou-kow-kuei, 800 m, N. of Vientiane, 17.iv.65, J.L. Gressitt (Bishop); 1 female, Dong Dok, 30.ix.65 (Bishop); 1 female, Nongtevada, 4.xi.65 (Bishop); 1 female, Gi. Sion Vill., de Tha Ngone, Vientiane, 24-31.x.66 (Bishop); 1 female, Pakse, Sedone Prov., 31.v.67 (Bishop); 1 female, Savannakhet, Savannakhet Prov., 15.iii.67 (Bishop); 1 female, Paksane, Borihane Prov., 15.xi.65 (Bishop). **Thailand.** 1 female, Bangkok, 14.ix.35, C. Tongyai (CU); 3 females, Koh Tao, 17.ix.28, H.M. Smith (NMNH); 3 females, Phet Chanburi, 3.ix.79, A. Pauly (FSAG); 1 female, Yala, 3.viii.76, A. Pauly (FSAG); 1 female, Kanchana Buri, 7.ix.76, A. Pauly (FSAG); 3 females, Bangkok, 3.vii.61, K. Iwata (Hokkaido); 1 female, Banna, 5-10.v.58, T.C. Maa (Bishop). **Malaysia.** 3 females, near Gombak, 12 mi. N.E. of Kuala Lumpur, 1.vi.73, C.D. Michener (SMUK); 3 females, Fraser's Hill, 12-16.ix.68, R. Jander (Hokkaido); 1 female, Fraser's Hill, 25.xii.64, R. Oghgushi (Hokkaido). **Singapore.** 1 male, vi.29, R.H.V. van Zwaluwenburg (Bishop). **Indonesia.** 2 females, Krakatau, v.08, E. Jacobson (Paris); 1 female, Petapan, Kangean Is., iii.36, K.M. Walsh (BMNH); 1 female, Tenggarong, Loa Teback, Borneo, 5.vii.37, K.M. Walsh (BMNH); 9 females, 10 males, Sumbawa, S.G. Rensch (Berlin); 1 female, Ende, Flores, 4.vi.29, I.M. Mackerras (NMNH); 1 female, Ende, Flores, 15.ii.27 (Berlin); 1 female, 2 males, Flores, S.G. Rensch (Berlin); 1 female, Medan, L. Fumek (Berlin); 10 females, 2 males, Waai, Ambon Is., 27.xi.64-15.i.66, A.M.R. Wegener (Bishop). **Philippines.** 6

females, 5 males, Abatan, Bugias, 600 km S. of Bontoc, 1800-2000 m, 19-20.v.64, H.M. Torreallas (Bishop); 1 male, Mayoyao, Ifugao, Mt. Province, 1200-1500 m, 2-3.viii.66, H.M. Torreallas (Bishop); 2 males, Wa-wa Dam, 150-200 m, Mt. Montalban, Rizal, 1.iii.65, H.M. Torreallas (Bishop); 1 female, 1 male, Baguio, Benguet, C.F. Baker (NMNH); 1 female, Wackwack, Rizal Prov., 12.ix.45, R.P. Dow (MCZ); 4 females, Biliran Is., C.F. Baker (NMNH); 1 female, Batbatan Is., 18.vi, R.C. McGregor (NMNH); 1 female, Lamao, Luzon (Leiden); 2 females, 2 males, Manila, 18.ii.74, I. Kudo (Hokkaido); 1 female (holotype of *P. philippinensis*), Manila, W.A. Stanton (NMNH); 1 female, Bureau of Agriculture, Manila, C.R. Jones (NMNH); 19 females, 3 males, 24.vii.19-xi.25, Manila, R.C. McGregor (NMNH); 1 female, 12.ii.19, Manila (NMNH); 13 females, 6 males, Mt. Makiling (=Maquiling), Laguna, C.F. Baker (NMNH); 11 females, 6 males, Mt. Maquiling, 50 m, Laguna, x.45-27.vii.48, L.B. Uichanco (UPLB); 2 females, 1 male, Mt. Maquiling, Laguna, 7.i.51-1.vii.59, C.R. Baltazar (UPLB); 3 females, Los Baños, Laguna, C.F. Baker (BMNH); 1 female, Los Baños, Laguna, E.M. Ledyard (NMNH); 17 females, 1 male, Los Baños, Laguna, C.F. Baker (NMNH); 2 females, Los Baños, vii.16, F.X. Williams (Bishop); 1 female, Los Baños, x-xi.15, F. Muir (Bishop); 4 females, 1 male, San Pablo, Laguna, 25.ii.74, I. Kudo (Hokkaido); 1 male, Mt. Banahaw, Quezon, C.F. Baker (NMNH); 1 female, 1 male, Guinobatan, Albay, 7.ix.54, L.B. Uichanco (UPLB); 2 females, 1 male, Cagusan, Libon, 200 m, Albay, 18-19.v.65, H.M. Torreallas (Bishop); 1 female, Mt. Isarog, Pili, 800-900 m, Camarines Sur, 22.iv.65, H.M. Torreallas (Bishop); 10 females, Lian area, Batangas, 19-27.vii.86, C.K. Starr (LNHM); 1 female, 8 males, San Antonio, Sto. Tomas, Batangas 14.xii.85, C.K. Starr (LNHM); 1 female, 2 males, Nasugbu, Batangas, 28.ii.58, H. Townes (AEI); 1 female, Rosario, La Union, 30.xi.53, H. Townes (AEI); 1 female, Hagonoy, Abulalas, Bulacan, 1.xi.86, C.K. Starr (LNHM); 1 female, Paggudpud, Balao, Ilocos Norte, 24-25.v.87, C.K. Starr (LNHM); 2 females, 1 male, Kaulakalau, Negros Occ., 20.ix (Bishop); 1 female, Culasi, Panay Is., vi.18, R.C. McGregor (AMNH); 1 female, Culasi, Panay, vi.18, McGregor (NMNH); 1 female, Palo, Leyte, 27.v.57 (Bishop); 1 female, Mindoro, xii.21, F.X. Williams (Bishop); 1 female, Puerto Princesa, Palawan, C.F. Baker (NMNH); 1 female, Puerto Princesa, R.C. McGregor (NMNH); 2 females, Ursula Island at South Palawan, 2.x.61, Noona Dan Exp. 61-62 (ZM); 1 female, Dalwan Bay, Balabac, 11.x.61, Noona Dan Exp. 61-62 (ZM); 3 females, 1 male, Cuernos Mts., Negros, C.F. Baker (NMNH); 1 female, Tacloban, Leyte, C.F. Baker (NMNH); 1 female, San Jose, Dadiangas, Cotabato, 3.viii.50, G.B. Viado (UPLB); 55 females (including holotype of *A. mindanaonis*),

14 males, Dapitan, Mindanao, C.F. Baker (NMNH), 5 females, 3 males, same data except (SMUK).

Remarks. The female type of *B. mindanaonis* has the clypeus mainly black with the clypeal mark T-shaped (Fig. 71), while in *B. philippinensis* the clypeus is partly black below and the clypeal mark narrows toward the apex (Fig. 69). Furthermore, the male from Mt. Makiling, Luzon has only 4 peglike processes on its left ventro-apical plate while the one from Mindanao has 5 processes. The number of processes on the ventro-apical plate, however, is quite variable within the species, ranging from 3 to 4 on the left plate and from 4 to 6 on the right plate. The gonostylus has two small hairs (Fig. 28); or the one near the apex is sometime absent. In most characters the nominal species are alike; for example both have light brown to dark and blunt to spiculate longer hairs on T4-6; therefore *B. mindanaonis* is synonymized under *B. philippinensis*. Cockerell (1916) identified two females from Baguio, Benguet, Philippines as *A. marginata picitarsis*, but based on the morphology and distribution of the specimens, these fit the description for *B. philippinensis*. This species is easily distinguished from other species of *Braunsapis* by its large size and light brown to dark longer hairs on T4-6.

Eight females from Thailand have the clypeus mostly yellow (quite similar to *hewitti*) and the longer hairs on T4-6 light brown. Unfortunately there are no associated males. It is quite possible that these females represent a different species. However, the females and male from Laos fit the description for *B. philippinensis*, and probably the population in Thailand is a variant among other mainland populations. Males usually have dark longer hairs on T4-6 and dark tarsi, but 2 males from Manila, 5 males from Mt. Makiling, Laguna, 10 males from Waai, Ambon and 10 males from Sumbawa, Indonesia have yellow tarsi and light brown to brownish hairs on T4-6.

Braunsapis hewitti (Cameron)

Prosopis hewitti Cameron, 1908: 565. Type: female, Kuching, Sarawak, Borneo, Malaysia (BMNH); Meade-Waldo and Morley, 1914: 403 (placed under *Allodape*).

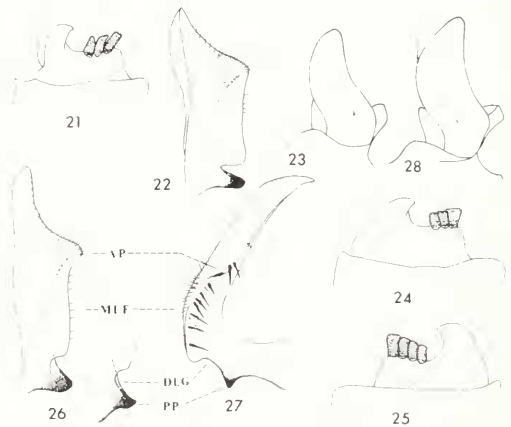
Allodape sauteriella Cockerell, 1916: 303. Type: female, Formosa (= Taiwan) (NMNH); Cockerell, 1929: 149 (distr. Thailand) (**New synonymy**).

Female. Face as in Figure 73. (1) Length 4.0-6.5 mm. (2) Labrum yellow to fusco-ferrugineous; mandible black, sometimes with yellow mark. (3) Clypeus entirely yellow, sometimes lower half partly black with clypeal mark narrowing toward apex. (*) Scape sometimes

with yellow mark underneath. (7) HW 1.27-1.73 mm (1.46 mm). (8) HW/HL ratio 1.09-1.16 (1.10). (11) Scape either not reaching or reaching front ocellus. (13) Hairs on T4-6 transparent to light brown; longer hairs slanting to suberect, blunt to spiculate; shorter hairs subprostrate, simple to blunt (Fig. 106).

Male. Face as in Figures 74, 75. (14) Length 4.0-5.3 mm. (15) Labrum yellow, mandible black. (17) Paraocular mark present or absent. (*) Scape yellow underneath. (18) HW 1.27-1.67 mm. (19) HW/HL ratio 1.12-1.19. (21) Hairs on T4-6 transparent to light brown; longer hairs suberect, simple to blunt; shorter hairs subprostrate, weakly spiculate. (22) Genitalia (n = 12) as in Figures 29-34; ventro-apical plate of gonocoxite either symmetrical or asymmetrical with 1-4 peglike processes (Figs. 32-34); penis valve with mid-lateral flange narrow with rounded posterior margin and dorso-lateral gap narrow, less than width of mid-lateral flange (Fig. 31); gonostylus longer than broad, slightly more tapered apically (Fig. 30) compared to *B. palavanica* (Fig. 35).

Specimens examined. **China.** 2 females, Hainan Is., 6.iv.60, Li Chang-xing (IZAS). **Taiwan.** 3 females (including holotype of *A. sauteriella*), Takao, 11.x-21.xi.07, H. Sauter (NMNH); 2 females, Takao, 15.x.07-xi.17, H. Sauter (BMNH); 3 females, Pilam, v-viii.12, H. Sauter (BMNH); 53 females, 2 males, Takao, 1907, Sauter (Budapest); 1 female, Taihanroku, 1908,



Figures 21-23. Male genitalia of *B. picitarsis*, Columbo, Sri Lanka. Fig. 21. Ventro-apical plate of the gonocoxite. Fig. 22. Penis valve, dorso-apical view. Fig. 23. Gonostylus, lateral view.

Figures 24-28. Male genitalia of *B. philippinensis*, Mt. Makiling, Luzon, Philippines. Figs. 24, 25. Ventro-apical plates of the gonocoxite, left and right plates, respectively. Fig. 26. Penis valve, dorso-apical view. Fig. 27. Same, lateral view. Fig. 28. Gonostylus, lateral view. AP, anterior projection; MLE, mid-lateral flange; DLG, dorso-lateral gap; PP, posterior projection.

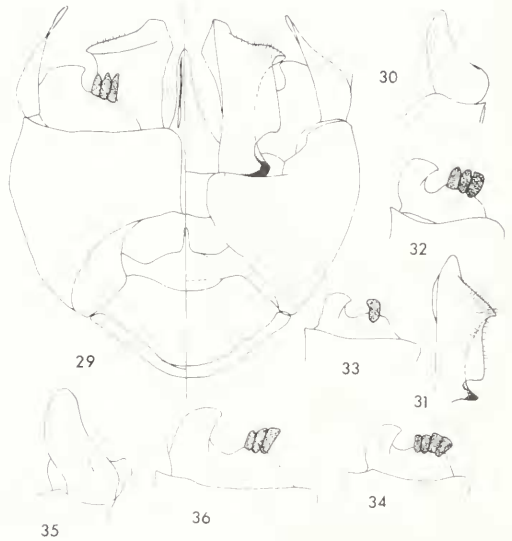
Sauter (Budapest); 1 male, Ins. Lambek, 1908, Sauter (Budapest); 3 females, 3 males, Kengting Park, 3.v.80, Y. Maeta (SMUK); 2 females, Szuchunhsi, 5.v.80, Y. Maeta (SMUK); 7 females, 1 male, Pingilin, 27.iv-4.v.74, M. Shiokawa (Hokkaido); 4 females, Wushe, 1150 m, 2.v.83, H. Townes (AEI); 1 female, Taitung Hsein, i-ii.64, T.C. Maa (Bishop); 2 females, Kwantau Shih, Nantou, 18.iv.73, S. Yamane (Hokkaido); 1 female, Juisui, Hualien County, 2.v.80, Sk. Yamane (Hokkaido); 2 females, 1 male, Oluampi, 6.v.76, M.A. Lieftinck (Leiden); 1 female, Shihmen nr Hengchuen, 7.v.76, M.A. Lieftinck (Leiden). **Thailand.** 1 female, Sam Ngao at Bhumipol Dam, 6-8.xi.79, Zool. Museum Exp. Copenhagen (ZM); 1 female, Konthathan waterfall area, 600 m, Doi Suthep-Pui National Park, 20-27.x.79, Zool. Museum Exp. Copenhagen (ZM); 1 female, Hua Hin, W. Coast of Siam Gulf, 8.viii.79, B. Petersen (ZM); 2 males, Paklua, N. of Pathaya, E. coast of Siam Gulf, 11-13.xi.79, Zool. Museum Copenhagen Exp. (ZM); 1 female, Doi Intanom, 8.vi.58, K. Yoshikawa (Hokkaido); 1 female, Chieng Dao, 4.xii.62, S. Nakao (Hokkaido); 4 females, Kan-chana Buri, 7-9.ix.76, A. Pauly (FSAG); 1 female, 1 male, Surat-Thani, 27.viii.76, A. Pauly (FSAG); 1 female, Nong Kai, 25.xii.62, S. Nakao (Hokkaido); 1 female, Doi Suthep, 18.-xi.62, S. Nakao (Hokkaido); 1 female, Chieng Mai (= Chiang Mai), 300 m, Chieng Mai Prov., 2.x.81, Zool. Museum Copenhagen Exp. (ZM); 2 males, Chiengmai (= Chiang Mai), 12.iii.61, K. Iwata (Hokkaido); 3 males, Chiangmai (= Chiang Mai), Fang, 5-19.iv.58, T.C. Maa (Bishop); 2 females, Banna, 108 m, 5-10.v.58, T.C. Maa (Bishop). **Laos.** 2 males, Paksong, Sedone Prov., 17.v.65, P.D. Ashlock (Bishop); 1 female, Muong SingT (T.N.W. of Luang Prabang, 650 m, 6-10.vi.60, S. and L. Quate (Bishop); 1 female, Luang Prabang, 300 m, 4-5.vi.60, L.W. Quate (Bishop); 1 female, Nongteva, 4.xi.65 (Bishop); 1 female, Wapi, Wapikhamthong Prov., 31.v.67, (Bishop); 3 females, Gi Sion Vill. of Nha Ngone, Vientiane, 721.ii.65-24.31.x.66 (Bishop); 2 females, Sayaboury, Sayaboury Prov., 25.viii.66 (Bishop). **Vietnam.** 19 females, 1 male, Ninh Hoa N. of Nha Trang, 28.xi.60, C.M. Yoshimoto (Bishop); 24 females, Dai Lan, N. of Phan Rang, 30.xi-5.xii.60, C.M. Yoshimoto (Bishop); 1 female, 15-35 km N.W. of Phan Rang, 8-16.xi.60, C.M. Yoshimoto (Bishop); 1 female, Ban Me Thuot, 500 m, 16-18.v.60, L.W. Quate (Bishop); 1 female, Di Linh (Djiring), 22-28.iv.60, L.W. Quate (Bishop); 1 female, Karyu, Danar, 200 m, 13-28.ii.61, N.R. Spencer (Bishop). **Hong Kong.** 1 female, v.58, N.L.H. Krauss (Bishop). **Malaysia.** 46 females, 8 males, George Town, Penang Is., 4.vi.73, C.D. Michener (SMUK); 1 female, Penang Is., C.F. Baker (NMNH); 3 females, 1 male, Penang Is., 12.vi-12.vii.55, H.T. Pagden (BMNH); 5 females, 5 males, Kuala Lumpur, 4.viii-7.xi.29, H.T. Pagden (BMNH); 24 females, 10 males, Kuala Lumpur, 2.iv-10.xii.35 (BMNH); 10 females, 1 male, Kuala Tahan, Malaya, 26-31.viii.70, R. Jander (Hokkaido); 4 females, 1 male, Kuala Tembeling, Malaya, 30.ix.68, R. Jander (Hokkaido); 1 male, Penan, Malaya, 3-4.x.68, R. Jander (Hokkaido); 2 females, Selangor, 15.ix.21-15.iv.26 (BMNH); 1 female, Kota Kinabalu, Sabah, 24.v.85, P.J. and J.O. Schmidt (SMUK); 5 females, Kota Kinabalu, Sabah, 24.v.85, J.O. Schmidt and C.K. Starr (L.NHM); 1 female, Forest Camp, 19 km. N. of Kalabakan, 30.xi.62, K.J. Kuncheria (Bishop); 1 female, Ranau, 30.ix-5.x.58, L.W. Quate (Bishop); 2 males, Pangkalan Tabang, Bau District, Sarawak, Borneo, 300-400 m, 5-8.-ix.58, T.C. Maa (Bishop); 1 female (holotype of *A. hewitti*), Kuching, Borneo (BMNH); 1 female, Kuching, Sarawak, 8.ix.66, Ocusea (Hokkaido); 16 females, 2 males, Sandakan, Borneo (NMNH); 1 female, Tawau Residency, 19.xi.58, T.C. Maa (Bishop). **Indonesia.** 1 female, Lang Eiland, Krakatau, v.08, E. Jacobson (Paris); 4 females, 2 males, Semarang, Java, 1906, E. Jacobson (Paris); 2 males, Batavia (= Jakarta), Java, ii-xi.08, E. Jacobson (Paris); 7 females, Oedjoeugkoelon, Bantain, Java, 12-13.ix.42, M.A. Lieftinck (Leiden); 5 females, Genteng Bay, Java, 1-2.vii.39, M.A. Lieftinck (Leiden); 2 females, 1 male, Baai, Batavia (= Jakarta), 15.x.38, M.A. Lieftinck (Leiden); 36 females, 10 males, Boyolali, 450 m, Central Java, 10-23.v.73, C.D. Michener (SMUK); 4 females, 1 male, 15 km W. of Boyolali, 1500 m, 10.v.73, C.D. Michener (SMUK); 3 females, 1 male, Bogor, West Java, 15.v.73, C.D. Michener (SMUK); 1 male, Buitenzorg (= Bogor), 8.xi.53, M.A. Lieftinck (Leiden); 2 females, Djasinga, Java, 2.viii.52, M.A. Lieftinck (Leiden); 3 females, Sumatra, ii.38, L.E. Cheesman (BMNH); 2 females, Tekuk Kabung Road, Padang Painan, Sumatra, 16.x.80, R. Ohgushi, S.F. Sakagami and T. Inoue (Hokkaido); 1 female, Bengen River, Tabang, 125 m, Borneo, 29.viii.56, A.M.R. Wegner (Leiden); 1 female, Kangean, 19.viii.54, A. Hoogerwerf (Leiden); 1 female, Komodo Is., vi.53, A. Hoogerwerf (Leiden); 2 females, Toraut, 211 m, Dumoga-Bone N. Pk., 47 km W.S.W. of Kotamobagu, Sulawesi, iv-v.85, G.R. Else (BMNH); 14 females, Ranu River, Tengah, Sulawesi, 11-19.v.80, P. Kevan (SMUK); 1 female, Petapan, Kangean Is., iii.36, K.M. Walsh (BMNH); 11 females, Kampung Pasir Puti, Jililolo Dist., Halmahera Is., ii.81-1-4.vi.81, A.C. Messer and P.M. Taylor (NMNH); 16 females, 12 male, Sumbawa, S.G. Rensch (Berlin); 12 females, 6 males, Flores, S.G. Rensch (Berlin); 1 female, S. Batjan, Moluccas, vi-vii.53, A.M.R. Wegner (Leiden). **Philippines.** 3 females, 4 males, Uring Uring, Brookes Point, Palawan, 16-26.viii.61, Noona Dan Exp. 61-62 (ZM); 4 females, Dalawan Bay, Balabac, 5-12.x.61, Noona Dan Exp. 61-62 (ZM); 1 male, Ursula Island at South Palawan, 2.x.61, Noona Dan Exp. 61-62 (ZM); 1 female, 92 males, Aborlan,

Isla Sombero, Palawan, 20.ii.87, C.K. Starr (LNHM); 1 female, San Antonio, Sto. Tomas, Batangas, 14.xii.85, C.K. Starr (LNMH); 1 female, Lian area, Batangas, 19-27.vii.86, C.K. Starr (LNMH); 1 female, Balaoi, Pagudpud, Ilocos Norte, 24-25.v.87, C.K. Starr (LNHM); 1 female, 2 males, nr. Kias, Mt. Prov., 31.x.53, Townes Family (AEI); 1 female, Arayat Natl. Park, Arayat, Pampanga, 11.v.77, C.R. Baltazar (UPLB); 3 males, Labrador, Pangasinan, 16.iii.67, M.A. Alviar (UPLB); 1 female, Hagonoy, Bulacan, 1.xi.86, C.K. Starr (LNHM); 1 female, Rees Road, Rizal Prov., 14.x.45, R.P. Dow (MCZ); 1 female, Dinalupihan Municipality, 5.5 mi. W. of Culo, Bataan Prov., 16.ix.45 (MCZ); 1 female, R. Brown, no locality (NMNH); 8 females, 10.xi.19-xi.25, Manila, R. C. McGregor (NMNH); 1 male, Manila, R. C. McGregor (CU); 1 female, Manila, R. Brown (NMNH); 2 females, Mt. Makiling (=Maquiling), Laguna, C.F. Baker (NMNH); 7 females, 5 males, Mt. Maquiling, 50 m, Laguna, 22.vi.48-24.v.50, L.B. Uichanco (UPLB); 1 female, Los Baños, Laguna, C.F. Baker (NMNH); 1 female, Los Baños, Laguna, C.F. Baker (AMNH); 2 females, Los Baños, Laguna, 2.vii.-5.xii.47, L.B. Uichanco (UPLB); 1 female, Los Baños, vii.16, F.X. Williams (Bishop); 1 female, Batangas, 30.i.60, B.P. Gabriel (UPLB); 1 female, Biliran Is., Baker (NMNH); 1 female, Guinobatan, Albay, 7.ix.54, L.B. Uichanco (UPLB); 4 females, 2 males, Sibuyan Is., C.F. Baker (NMNH); 1 male, Sulat, San Francisco, Samar, 24.iv.87, C.K. Starr (LNHM); 1 female, Negros Occ., 20.ix (Bishop).

Remarks. The type of *B. hewitti* (HW 1.40 mm) is similar to that of *B. sauteriella* (HW 1.60 mm) except that it is smaller. Earlier, the population found in Taiwan was treated under the name *sauteriella*. Five females from Pingilin, Taiwan are smaller (HW 1.37-1.50 mm) and six females from the type locality (Takao, Taiwan) are also relatively small (HW 1.43-1.50 mm), compared to the type of *B. sauteriella* (HW 1.60 mm). All the females have the clypeus entirely yellow, the longer hairs on T4-6 transparent and simple to blunt, the labrum yellow and the mandibles black. The same is true for the males. The ventro-apical plate of the gonocoxite has 1 ($n=1$) or 3 ($n=4$ individuals from the same nest) peglike processes in the Indonesian population (Figs. 32, 33), 2 to 4 ($n=3$ individuals from the same nest) in the Malaysian population and 2 to 4 ($n=4$) peglike processes in the Taiwan population (Fig. 34). The number of peglike processes on the ventro-apical plate therefore varies among individuals found in the same nest as well as those found in the same locality. The size differences between the types as well as the differences in the number of the peglike processes on the ventro-apical plate of the gonocoxite of the males led me, at first, to think that these two are different

species. However, variability in the number of peglike processes among the oriental and Australian species is quite common. Furthermore, the size differences do not show a bimodal distribution as would be expected if two species were involved. *Allodape sauteriella* is therefore synonymized under *B. hewitti*.

Females of *B. cupulifera* cannot be readily separated from those of *B. hewitti* except for the hairs on T4-6, which are simple in the former and blunt to spiculate in the latter. Furthermore, the head of *B. hewitti* (HW/HL ratio 1.09-1.16) is slightly broader than that of *B. cupulifera* (HW/HL ratio 1.05-1.09). The relatively large females of *B. hewitti* from Java and Malaysia (HW 1.53-1.63 mm) have their antennal scape reaching the front ocellus, while the smaller ones (HW 1.27-1.50 mm) have the scape not or barely reaching the front ocellus; this variation is known in other species that vary in size. The males of *B. mixta* are also not easily distinguished from *B.*



Figures 29-34. Male genitalia of *B. hewitti*, Boyolali, Central Java, Indonesia. Fig. 29. Dorsal (right) and ventral (left) view of male genitalia. Fig. 30. Gonostylus, lateral view. Fig. 31. Penis valve, dorso-apical view. Figs. 32, 33. Ventro-apical plates of gonocoxite, individuals from the same nest from Boyolali, Central Java. Fig. 34. Ventro-apical plate of gonocoxite, individual from Pingilin, Taiwan.

Figures 35, 36. Male genitalia of *B. palawanica*, Puerto Princesa, Palawan, Philippines. Fig. 35. Gonostylus, lateral view. Fig. 36. Ventro-apical plate of gonocoxite.

hewitti except for the longer hairs on T4-6, which are blunt to spiculate in the former and simple to blunt in the latter. In addition, *B. hewitti* is limited to the Southeast Asian region while *B. mixta* is found only in India, Pakistan and Sri Lanka.

Ten females from Sulawesi, Indonesia, and four from Wushe, Taiwan, have yellow mandibles and yellow marks under the scape. Forty females from Vietnam, ten from Sumbawa, seven from Java and Sumatra, five from Halmahera, five from Sulawesi, nine from Laguna, and three from Manila and Bataan have the lower half of the clypeus partly black with the clypeal mark narrowing toward the apex. Three males from Taiwan, one from Thailand, two from the Philippines and three from Indonesia have the paraocular mark either reduced or absent.

The life cycle, nesting biology and social behavior of this species (under the name *Braunsapis sauteriella*) from Taiwan were studied by Maeta et al. (1984, 1985), Sakagami (1960) and Shiokawa and Michener (1977).

Braunsapis flaviventris, n. sp.

Holotype: female, Nabon, Thailand, 15.vii.61, K. Iwata (SMUK). *Paratypes*: 2 females, same data as holotype except (Hokkaido).

Female. Face as in Figure 76. (1) Length 4.6-5.2 mm. (2) Labrum yellow, mandible black. (3) Clypeus entirely yellow. (7) HW 1.37-1.40 mm (1.37 mm). (8) HW/HL ratio 1.14-1.19 (1.14). (11) Scape barely reaching front ocellus. (13) Hairs on T4-6 transparent; longer hairs slanting, weakly spiculate, longer than width of scape; shorter hairs prostrate, weakly spiculate. (*) Metasomal terga largely yellow.

Additional specimens examined. **Sri Lanka**. 1 female, no locality (BMNH). **Burma**. 1 female, Mandalay, 15.ix.00, Bingham (Berlin). **Malaysia**. 1 female, Relau, Penang, 12.xi.56, H.T. Pagden (BMNH).

Remarks. The female has a yellowish clypeus (Fig. 76), its head (HW/HL ratio 1.14-1.19) relatively broader than that of *B. cupulifera* and the longer hairs on T4-6 transparent and weakly spiculate. This species is almost identical to *B. hewitti* and it is possible that these females may be just atypical specimens of *B. hewitti*. Collection of the males and the nest of this species will clarify whether this is really a good species. It is quite remarkable, however, in having yellowish metasomal terga; this character also separates it from all other oriental species of *Braunsapis*.

The name *flaviventris* is derived from the Latin *flavus*, meaning yellow, plus the Latin *venter*, meaning abdomen, referring to the largely yellow metasomal terga of the species.

Braunsapis palavanica (Cockerell)

Allodape palavanica Cockerell, 1916: 303. Type: female, Puerto Princesa, Palawan, Philippines (NMNH).

Female. Face as in Figure 77. (1) Length 5.5-7.3 mm. (2) Labrum yellow, mandible sometimes with yellow mark. (3) Clypeus entirely yellow. (4) Paraocular mark present. (*) Scape yellow underneath, sometimes absent. (7) HW 1.63-1.77 mm (1.70 mm). (8) HW/HL ratio 1.07-1.11 (1.11). (10) Middle of epistomal suture raised. (11) Scape reaching front ocellus. (13) Hairs on T4-6 light brown to fuscous; longer hairs suberect, simple to blunt; shorter hairs prostrate, simple.

Male. Face as in Figures 78, 79. (14) Length 5.5-6.4 mm. (15) Labrum yellow, mandible black. (*) Scape yellow underneath, sometimes absent. (18) HW 1.63-1.73 mm. (19) HW/HL ratio 1.11-1.14. (21) Hairs on T4-6 fuscous; longer hairs suberect, simple to blunt; shorter hairs prostrate, simple. (22) Genitalia (n = 5) as in Figures 35, 36; ventro-apical plate of gonocoxite with 3 peglike processes (Fig. 36); gonostylus longer than broad, with one seta (Fig. 35); penis valve as in *B. hewitti*.

Specimens examined. **Malaysia**. 1 female, Fraser Hill, 25.xii.64, R. Ohgushi (Hokkaido); 1 female, Ranau, 8 mi. N. of Paring Hot Spring, 500 m, W. Coast Residency, N. Borneo, 8-11.x.58, L.W. Quate (Bishop); 1 female, Ranau, 500 m, W. Coast Residency, N. Borneo, 7.x.58, T.C. Maa (Bishop). **Indonesia**. 1 female, Sungai Dareh, Sumatera Barat, 5.i.81, S. Yamane (Hokkaido); 1 female, Ranu River, Tengah, Sulawesi, 11.ii.80, P. Kevan (SMUK). **Philippines**. 10 females (including holotype), 3 males, Puerto Princesa, Palawan, C.F. Baker (NMNH); 14 males, Aborlan, Isla Sombbrero, Palawan, 20.-ii.87, C.K. Starr (LNHM); 1 female, Macagua, 75 m, Brooke's Point, Palawan, 1-4.iv.62, M. Thompson (Bishop); 2 females, Uring Uring, Brookes Point, Palawan, 16-26.vii.61, Noona Dan Exp., 61-62 (ZM); 7 females, Pinigisan, 600 m, Mantalingajan, Palawan, 2-22.ix.61, Noona Dan Exp. 61-62 (ZM).

Remarks. The female of this species is readily distinguished by having paraocular facial marks (Fig. 77) and fuscous hairs on T4-6. The presence of the paraocular marks is shared with *B. clarihirta*, *B. apicalis* and *B. lateralis*. *B. clarihirta* is relatively smaller (HW 1.32-1.60 mm), the scape has a yellow mark underneath and the longer hairs on T4-6 are transparent. *B. apicalis* and *B. lateralis* have the lower half of the clypeus partly black and the longer hairs on T4-6 light brown. Two females from Borneo and three females from Palawan have small yellow spots on their mandibles. The males of *B. palavanica* have simple trochanters and the longer hairs on T4-6 fuscous. They are quite similar to males of *B. philippinensis*

and *B. picitarsis* but can be separated from the first by their smaller size (HW 1.63–1.73 mm) and the yellow clypeus (Figs. 78, 79) with the clypeal mark not reduced as in *B. philippinensis* (Figs. 70, 72) and from *B. picitarsis* (Fig. 68) by having the paraocular mark either reduced or absent (Figs. 78, 79).

Braunsapis malliki, n. sp.

Holotype: female, Cashew Research Station, Ullal, Mangalore, India, B. Mallik (BMNH). *Paratypes*: 2 females, same data as holotype except (Bangalore); 2 females, same except (Delhi); 2 females, same except (SMUK); 1 female, same except (BMNH).

Female. Face as in Figure 80. (1) Length 4.8–5.6 mm. (2) Labrum yellow, mandible fuscoferrugineous to black. (3) Clypeus entirely yellow. (*) Scape yellow underneath. (7) HW 1.48–1.67 mm (1.53 mm). (8) HW/HL ratio 1.13–1.18 times broader than long. (11) Scape barely reaching or reaching front ocellus. (13) Hairs on T4–6 light brown; longer hairs slanting, spiculate, longer than width of scape; shorter hairs prostrate, spiculate. (*) Tibia and tarsus orange.

Remarks. This species is easily separated from other species occurring in India by the yellow clypeus and the orange tibiae and tarsi. It is also similar to *B. hewitti* (which does not occur in India) in having a yellow clypeus, but differs from it by having light brown hairs on T4–6 and the legs partly orange. Furthermore, the face is slightly more convex and glossy compared to females of *B. hewitti*.

This species is named for Dr. B. Mallik of the University of Agricultural Sciences, Bangalore, India, for his contribution to the knowledge of parasitic Hymenoptera, and for his interest in bees.

THE PUANGENSIS SPECIES GROUP

This species group includes only one species. However, the males are quite distinctive in having the hind femur swollen basally and emarginate on the undersurface (Figs. 101, 102), the penis valve with a hairy lobe on the posterior margin of the mid-lateral flange (Figs. 39, 40) and the ventro-apical plate of the gonocoxite reduced medially (Figs. 37, 38, 40). The females are quite similar to those of *B. mixta* except that the lower half of the clypeus is mostly black, the clypeal mark narrower toward the apex and the head less broad than in *B. mixta*. It is possible that this species is a derived member of the *mixta* species group, as is suggested by the number of uniquely derived features found in the males described below.

Braunsapis puangensis (Cockerell)

Allodape puangensis Cockerell, 1929: 149. Type: female, Kum Perang Creek, Thailand (NNNH).

Allodape iwatai Sakagami, 1961: 424. Type: female, Cheng Mai (= Chiang Mai), Thailand (Osaka) (**New synonymy**) Holotype lost; **neotype**, female, Cheng Mai (= Chiang Mai), Thailand (SMUK).

Female. Face as in Figure 81. (1) Length 4.2–6.7 mm. (2) Labrum fusco-ferrugineous, mandible black. (3) Clypeus partly black below with clypeal mark narrowing to a point toward apex. (4) Paraocular mark absent. (*) Scape sometimes yellow underneath. (6) Tegula transparent, axillary sclerites yellow. (7) HW 1.20–1.60 mm (1.34 mm). (8) HW/HL ratio 1.06–1.11 (1.11). (10) Middle of epistomal suture slightly raised. (11) Scape not reaching front ocellus. (12) Basitibial plate with carina indistinct. (13) Hairs on T4–6 transparent to partly fuscous; longer hairs slanting to suberect, simple to spiculate; shorter hairs prostrate, simple to weakly spiculate (Fig. 105).

Male. Face as in Figure 82. (14) Length 4.0–5.2 mm. (15) Labrum yellow, mandible black. (16) Clypeus entirely yellow. (17) Paraocular mark absent. (18) HW 1.13–1.43 mm. (19) HW/HL ratio 1.10–1.13. (20) Hind trochanter simple. (*) Hind femur emarginate medially, swollen basally (Figs. 100, 101). (*) Tarsi dark. (21) Hairs on T4–6 fuscous; longer hairs suberect, simple; shorter hairs prostrate, simple. (22) Genitalia (n=5) as in Figures 37–41; ventro-apical plate of gonocoxite reduced medially, with 3 to 4 peglike processes (Figs. 37, 38, 40); penis valve with mid-lateral flange expanded and posterior margin lobed and hairy, dorso-lateral gap less than width of mid-lateral flange (Fig. 39, 40); gonostylus truncate at apex, with one small seta (Fig. 41); S8 with upturned spiculum as in Figure 16; roof of genital chamber wrinkled.

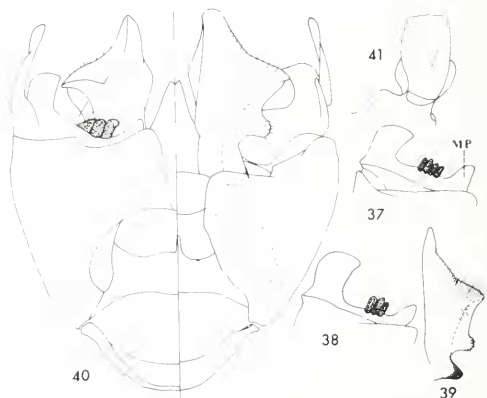
Specimens examined. **India**. 1 male, Chandigan, Punjab, India, 17.iv.65, S.W.T. Batra (SMUK); 3 females, 3 males, Punjab Agri. Univ., Ludhiana Campus, Punjab, India, 17.v.65, S.W.T. Batra (SMUK); 1 female, same except ix.64 (SMUK); 2 females, Abbottabad, Uttar Pradesh, 10.vi.16, Fletcher Coll. (Delhi); 1 female, Coimbatore, 1400 ft., Madras (= Tamil Nadu), S. India, ix.64, P.S. Nathan (SMUK); 1 female, Walayar, Kerala, 29.i.78 (Hokkaido); 5 females, Poona (= Pune), W. India, 29.x.66–21.iv.67 (Oxford); 1 female, same except (NMNH); 1 female, Katra, Ghats, W. India, x.58 (Oxford); 5 females, 1 male, Lonaola, W. Ghats, W. India, 9.iv.66–29.iv.67 (Oxford); 1 female, same except (BMNH); 1 female, Deesa (NMNH); 1 female, Deesa (BMNH); 2 females, Goa, 23.xi.27–22.viii.31, H. Schmidt (Berlin); 3 females, Kengeri, near Bangalore, Karnataka, 1.v.82, B. Mallik (Bangalore); 1 female, 916 m, Bangalore, Karnataka, 25.iv.78 (ZM); 1 female, Jeolikote, 21 km N.W. of Kathgodam, Kumaon, 1800 m,

7.x.78, M.A. Lieftinck (Leiden). **Nepal.** 1 female, 2 males, Katmandu, 23-26.iii.68, T. Matsumura (Hokkaido); 1 male, Godavari, Napal Valley, 26.iii.68, T. Matsumura (Hokkaido); 2 females, Bonuwa, 28.v.68, T. Matsumura (Hokkaido); 1 female, Dana, Palpla, 3.v.68, T. Matsumura (Hokkaido); 1 female, Pokhara, 25.v.68, T. Matsumura (Hokkaido). **China.** 3 females, Hainan Is., 10-340 m, Li Chang-xing and Zhang Xue-zhong (IZAS); 1 female, Xishuangbana, 650 m, Yunnan Prov., 14.vii.58, Zhang Eh-ren (IZAS). **Thailand.** 1 female (holotype of *A. puangensis*), Kum Perang Creek (BMNH); 4 females, Chanta Buri, 17-18.vi.61, K. Iwata (Hokkaido); 1 female, Chienglow, 14.iv.61, K. Iwata (Hokkaido); 1 female, Saraburi, 8.ii.61, K. Iwata (Hokkaido); 1 female, Fang, 29.xi.62, S. Nakao (Hokkaido); 3 females, Cheng Mai (=Chiang Mai), 23-29.i.58, K. Yoshikawa (Hokkaido); 3 females (including neotype of *A. iwatai*), same except (SMUK); 2 females, Chiengmai (=Chiang Mai), F.G. Kerr (BMNH); 1 female, same except (NMNH); 5 females, Kanchana Buri, 7.ix.76, A. Pauly (FSAG); 1 female, Yala, 3.viii.76, A. Pauly (FSAG); 1 female, Surat-Thani, 27.viii.76, A. Pauly (FSAG); 4 females, 12.vii.76, A. Pauly (FSAG); 1 female, Songkla, 16.viii.76, A. Pauly (FSAG); 3 females, 3 males, Nakhon, 108 m, S. Banna, 5-10.v.58, T.C. Maa (Bishop); 1 female, Chawang nr. Nabon, 70 m, 4.ix.58, J.L. Gressitt (Bishop); 1 female, Ban Muak Lek Nat. Park, Saraburi Prov., 5.vi.65 (Bishop). **LAOS.** 1 female, 1 male, Paksong, Sedone Prov., 17-18.v.65, P.D. Ashlock (Bishop); 5 females, 3 males, Gi Sion Vill., de Tha Ngone, Vientiane Prov., 9-30.i.66 (Bishop); 1 male, Ban Van Eue, 31.xii.68 (Bishop); 1 male, Paksane, Borikhane Prov., 14.ii.66 (Bishop). **Vietnam.** 3 females, 2 males, Fyan, 900-1,200 m, 11.vii-9.viii.61, N.R. Spencer (Bishop); 7 females, 6 males, Mt. Liang Bian, 1500-2000 m, 19.v-8.vi.61, N.R. Spencer (Bishop); 14 females, 6 males, Dalat 6 km S., 1400-1500 m, 9.iv-7.vii.61, N.R. Spencer (Bishop); 1 female, Dalat, 1500 m, 29.iv-4.v.61, N.R. Spencer (Bishop); 1 km W. of Dalat, 1500 m, 19.ix.60, R.E. Leech (Bishop); 1 female, Karyu Danar, 200 m, 13-28.ii.61, N.R. Spencer (Bishop); 1 female, Ninh Hoa N. of Nha Trang, 28.xi.60, C.M. Yoshimoto (Bishop); 1 female, Ban Me Thuot, 500 m, 16-18.v.60, S. Quate (Bishop); 2 males, Di Linh (Djiring), 900 m, 22-28.iv.60, S. and L.W. Quate (Bishop); 1 male, Di Linh (Djiring), 27.ix-14.x.60, C.M. Yoshimoto (Bishop). **Malaysia.** 27 females, 9 males, Ampang, E. of Kuala Lumpur, 3.vi.73, C.D. Michener (SMUK); 14 females, 6 males, Ampang, nr. Kuala Lumpur, 30.ix.73, P.O. Wah (SMUK); 1 female, 7 males, Kuala Lumpur, 4.viii-22.ix.29, H.T. Pagden (BMNH); 11 females, 7 males, Kuala Lumpur, 15.i.22-5.xii.35 (BMNH); 1 female, 1 male, Kuala Lumpur, xi.35-28.vi.36, H.M. Pendlebury (BMNH); 4 females, 2 males, George Town, Penang Is., 4.vi.73, C.D. Michener (SMUK); 1 female, Sun-

gei, Pinang Hills, Penang Is., 4.vi.73, C.D. Michener (SMUK); 3 females, Penang Is., 12.viii.76, A. Pauly (FSAG); 1 female, Gombak Valley, Selangor, 25.i.31, (BMNH); 1 female, Batang Padang, Perak, 7.iii.24, H.M. Pendlebury (BMNH); 1 female, W. Coast Residency, Ranau, 8 mi. N. of Paring Hot Spring, 500 m, 9-18.x.58, T.C. Maa and L.W. Quate (Bishop); 1 female, Forest Camp, 19 km N. of Kalabakan, 600 m, 21.xi.62, K.J. Kuncheria (Bishop). **Hong Kong.** 1 female, 600 ft., 24.ix.37, Hurford (BMNH).

Remarks. The type and paratype of *Allodape iwatai* could not be located and are presumed lost. Dr. Sakagami kindly searched for the type and the rest of the series that he studied from Thailand but could not find these in the Osaka collection. I, therefore, designate a neotype for *A. iwatai* from the other specimens collected from that same study; the neotype is in SMUK. The female of *A. iwatai* is similar to the female type of *B. puangensis* and the species is therefore judged to be a synonym of *puangensis*.

Aside from the character of the femur, the penis valve of the male is quite distinct in having an expanded mid-lateral flange with a lobed and hairy posterior margin (Fig. 39). The males from Georgetown, Malaysia have 3 peglike processes on the ventro-apical plate (Fig. 38) while a male from Ampang (E. of Kuala Lumpur) has 4 peglike processes (Fig. 37). Females have the clypeal mark narrowing toward the apex, the longer hairs on T4-6 light brown to partly



Figures 37-41. Male genitalia of *B. puangensis*, Malaysia. Figs. 37, 38. Ventro-apical plates of the gonocoxite, from Georgetown (Penang) and Ampang, Malaysia, respectively. Fig. 39. Penis valve, dorso-apical view. Fig. 40. Dorsal (right) and ventral (left) view of genitalia, male from Punjab, India. Fig. 41. Gonostylus, lateral view. MP, mesal process of ventro-apical plate.

fuscous and the head relatively broad (HW/HL ratio 1.08–1.11). Females are somewhat similar in facial markings to some females of *B. cupulifera* from Sumatra, which have a slightly reduced clypeal mark (Fig. 84), but the latter usually have yellow mandibles and scape, the longer hairs on T4–6 are transparent to light brown and simple and the head is less broad (HW/HL ratio 1.05–1.09) than in *B. puangensis*.

Specimens from India are smaller in size as shown by head width (female HW 1.20–1.47 mm; male HW 1.13–1.14 mm) and the longer hairs on T4–6 shorter, transparent and weakly spiculate. The females are sometimes not easily separated from *B. mixta*, which occurs sympatrically in India. The clypeal mark of some females of *B. mixta* approaches that of *B. puangensis* but *B. mixta* differs from the latter by having a relatively broader head (HW/HL ratio 1.14–1.18).

THE CUPULIFERA SPECIES GROUP

This species group is readily distinguished by the males having the trochanter excised medially and lobed distally (Fig. 100). Furthermore, the mandibles of both males and females are yellow or with yellow markings. The male genitalia of this species group are variously modified, and at least three subgroups can be distinguished. *B. reducta* has the ventro-apical plate of the gonocoxite notched medially along the apical margin, the peglike processes situated in this concavity (Fig. 50), and the mid-lateral flange of the penis valve with the posterior margin broadly rounded. *B. cupulifera* has the mid-lateral flange acutely angled posteriorly (Fig. 49). *B. reversa* and *B. signata* have the mid-dorsal part of the penis valve subtriangular when viewed from above (Fig. 55) and the mid-lateral flange relatively expanded compared to other species. *B. clarihirta* and *B. aurantipes* have the penis valve relatively more slender compared to other species (Figs. 44, 60). I consider the lobed and excised hind trochanter derived compared to the simple form found in the other species groups, and the different modifications of the genitalia of this species group seem to support that idea. There may be, however, two or more monophyletic groups lumped together in the *cupulifera* species group if the trochanteral modifications have arisen more than once. This problem will be clarified when other characters, especially those of the immatures, are considered in the future.

Females of *B. cupulifera* and *B. clarihirta* have the clypeus entirely yellow and the latter has paraocular marks. Females of *B. reducta*, *B. reversa* and *B. signata* have the clypeus partly black below; in addition to the latter character, *B. apicalis* and *B.*

lateralis have paraocular marks. Females of *B. aurantipes* and *B. indica* have the head as long as or longer than broad.

Braunsapis cupulifera (Vachal)

Allodape cupulifera Vachal, 1894: 447. Type: male, Carin Cheba, 900–1100 m, Birminia (= Burma) (Genoa). *Allodape cupulifera bakeri* Cockerell, 1916: 302. Type: male, Los Baños, Laguna, Luzon, Philippines (NMNH) (**New synonymy**). *Allodape hewitti* var. *sandakanensis* Cockerell, 1920a: 226. Type: female, Sandakan, Borneo, Malaysia (NMNH) (**New synonymy**).

Female. Face as in Figures 83, 84. (1) Length 4.2–5.9 mm. (2) Labrum yellow to fusco-ferrugineous, mandible black, sometimes with yellow mark. (3) Clypeus entirely yellow, sometimes slightly reduced apically. (4) Paraocular mark absent. (*) Scape sometimes yellow underneath. (6) Tegula transparent, axillary sclerites yellow. (7) HW 1.20–1.47 mm. (8) HW/HL ratio 1.05–1.09. (10) Middle of epistomal suture slightly raised. (11) Scape not reaching front ocellus. (12) Basitibial plate indicated by indistinct carina. (13) Hairs on T4–6 transparent to light brown; longer hairs slanting, simple; shorter hairs prostrate, simple.

Male. Face as in Figure 85. (14) Length 3.8–4.6 mm. (15) Labrum and mandible yellow. (16) Clypeus entirely yellow. (17) Paraocular mark present, sometimes slightly reduced. (*) Scape yellow underneath, sometimes black. (18) HW 1.15–1.37 mm (1.37 mm). (19) HW/HL ratio 1.08–1.09 (1.08). (20) Hind trochanter excised medially and lobed distally. (21) Hairs on T4–6 light brown; longer hairs slanting, simple; shorter hairs prostrate, simple. (22) Genitalia (n 10) as in Figures 45–49, ventro-apical plate of gonocoxite with 3–5 peglike processes (Figs. 45–47); penis valve with mid-lateral flange expanded with angulate posterior margin and dorso-lateral gap wider than mid-lateral flange (Fig. 49); gonostylus longer than broad, slightly expanded apically, with one short seta; S8 with an upturned spiculum as in Figure 16; roof of genital chamber wrinkled.

Specimens examined. **Thailand.** 2 females, Ratburi, 15.viii.66, T.C. Maa (Bishop). **Vietnam.** 3 females, Fyan, 1200 m, 11.vii–9.viii.61, N.R. Spencer (Bishop); 1 female, Blao (Balao), 500 m, 14–21.x.60, C.M. Yoshimoto (Bishop); 1 female, Di Linh (Djiring), 1200 m, 22–28.iv.60, L.W. Quate (Bishop); 3 females, Di Linh (Djiring), 27.ix–14.x.60, C.M. Yoshimoto (Bishop); 3 females, Kontum N. of Pleiko, 550 m, S. Quate (Bishop). **Burma.** 1 male (holotype of *A. cupulifera*), Carin Cheba, 900–1100 m (Genoa). **Malaysia.** 1 male, George Town, Penang Is., 4.vi.73, C.D. Michener (SMUK); 1 female, Sungei, Pinang Hills, Penang Is., 30.xi.55, H.T. Pagden (BMNH); 4 females, Pasoh Forest Res., Negri S., 29.x.79–11.v.80, P. and M. Becker (AEI); 1 female, Kuala Lumpur, 27.ix.29, H.T. Pagden (BMNH); 7 females, 1 male, Kuala

- Lumpur, 6.vii.26-ix.40 (BMNH); 2 females, 1 male, Kuala Lumpur, 4.i.36-30.iv.39, H.M. Pendlebury (BMNH); 1 female, Sungei Pomsom, Ubu Hangat, 9.ix.28, H.T. Pagden (BMNH); 1 female, Santubong, 797-1500 m, Kuching, Sarawak, Borneo, 26.vi.58, T.C. Maa (Bishop); 1 female, Lake area, Bau, Sarawak, Borneo, 29.viii.58, T.C. Maa (Bishop); 1 female, Sarawak, 19.vi.61, M. Wan (BMNH); 1 male, Ranau, N. Borneo, 30.ix-5.x.58, L.W. Quate (Bishop); 1 female, Sandakan, Borneo, C.F. Baker (AMNH); 13 females (including holotype of *A. hewitti sandakanensis*), 2 males, Sandakan, Borneo, C.F. Baker (NMNH); 1 female, Mt. Kinabalu, 5000 ft., Sabah, 1-5.v.73, K.M. Guichard (BMNH). **Singapore.** 1 female, 1905, H.N. Ridley (BMNH); 2 females, vi.29, R.H.V. van Zwaluwenburg (Bishop); 2 females, 5 males, C.F. Baker (NMNH); 10 females, Bukit Tinak, 12.x.86, J. W. Wenzel (SMUK). **Indonesia.** 20 females, 13 males, Boyolali, 450 m, Central Java, 10.v.73, C.D. Michener (SMUK); 8 females, 15 km W. of Boyolali, 1500 m, Central Java, 10.v.73, C.D. Michener (SMUK); 5 females, Genting Bay, Java, 1.vii.39, M.A. Lieftinck (Leiden); 3 females, Depok, Java, 25.xii.38-18.v.39, M.A. Lieftinck (Leiden); 3 females, Batavia (=Jakarta), Java, 1908, E. Jacobson (Paris); 5 females, Baai, Batavia (=Jakarta), Java, 15.x.38, M.A. Lieftinck (Leiden); 9 females, 1 male, Batavia (=Jakarta), Java, x.07-v.09, E. Jacobson (Leiden); 1 female, Tapos, 800 m, Gedeh, Java, 16.x.32, M.A. Lieftinck (Leiden); 3 females, Tjisaroa, Gedeh, Java, 22.i-14.v.39, M.A. Lieftinck (Leiden); 2 females, Tjisaroa, Mt. Panggerango, 1000 m, Java, 11.i.42-6.vi.48, M.A. Lieftinck (Leiden); 1 female, Panggerango, Mt. Gede, 1450 m, Java, 2.viii.52, Lieftinck (Leiden); 10 females, 1 male, Bogor, West Java, 15.v.73, C.D. Michener (SMUK); 1 female, Buitenzorg (=Bogor), Java (AMNH); 2 females, Buitenzorg (=Bogor), Java 1.i.39-6.iv.53, M.A. Lieftinck (Leiden); 1 female, Oedjoengkoelon, Bantam, Java, 12.ix.42, M.A. Lieftinck (Leiden); 1 female, Djamnangs, Bodjonglopang, Java, 1.i.41, M.A. Lieftinck (Leiden); 1 female, Djampang, Java, xii.39 (Leiden); 1 female, 3 males, Djasinga, Java, 26.xi.39-8.xii.40, M.A. Lieftinck (Leiden); 1 female, Semarang, Java, 1906, E. Jacobson (Paris); 1 female, Java (no locality), v.29, R.H.V. van Zwaluwenburg (Bishop); 4 females, Sibolangit, 450 m, Sumatra, 16-17.xi.50, M.A. Lieftinck (Leiden); 2 females, Mt. Tanggamoos, 600 m, Sumatra, 19-31.iii.40, M.A. Lieftinck (Leiden); 7 females, 1 male, S.W. Lampong Dist., Mt. Tanggamoos, 600 m, Sumatra, xii.39, M.A. Lieftinck (Leiden); 2 females, 4 males, Kampung Pasir Putih, Jailolo Dist., Halmahera Is., 15-31.v.81, A.C. Messer and P.M. Taylor (NMNH); 3 females, Petapan, Kangean Is., iii.36, K.M. Walsh (BMNH); 1 female, Sangkoeling Bay, Borneo, 30.iv.37, K.M. Walsh (BMNH); 1 female, Pelewan Mt., Borneo, vi.37, K.M. Walsh (BMNH); 1 female, Sangeang Is., Lesser Sunda Is., 23.viii.65, J. Winkler (Bishop); 1 female, Flores, S.G. Rensch (Berlin); 1 female, Ende, Flores, S.G. Rensch (Berlin); 3 females, 2 males, Sumbawa, S.G. Rensch (Berlin). **Philippines.** 1 female, Imugin, Viscaya, C.F. Baker (NMNH); 3 males, Pangasinan, C.F. Baker (NMNH); 12 males, Wa-wa Dam, 150-200 m, Mt. Montalban, Rizal, 27.ii-29. iii.65, L.M. Torrevillas (Bishop); 2 females, 3 males, Palawan, 3 km N.E. of Tinabog, 7-15.v.62, H. Holtmann (Bishop); 3 females, 2 males, Uring Uring, Brookes Point, Palawan, 25.viii.61, Noona Dan Exp. 61-62 (ZM); 1 female, Tarawakan, N. of Batu Batu, Tawi Tawi, 27.x.61, Noona Dan Exp. 61-62 (ZM); 2 males, Pignisan, 600 m, Mantalingajan, Palawan, 11-22.ix.61, Noona Dan Exp. 61-62 (ZM); 3 females, 1 male, Aborlan, Isla Sombrero, Palawan, 20.ii.87, C.K. Starr (LNHM); 8 males, Canaualan, Pangasinan, 18.iii.36, Roman Abalos (SMUK); 11 females, 1 male, Subic Bay, Grand Is., Luzon, 7.x-15.xi.67, C.E. Goodpasture (LNHM); 6 females, 1 male, Manila, vi.19.vii.20, R.C. McGregor (SMUK); 12 females, Manila, 19.-xi.25, R.C. McGregor (AMNH); 57 females, 5 males, Manila, 11.ii.19-xi.25, R.C. McGregor (NMNH); 3 females, 1 male, same except (SMUK); 1 female, Manila, 19.xi.25, R.C. McGregor (BMNH); 4 females, Manila, R. Brown (NMNH); 1 female, 1 male, Manila, W.A. Stanton (NMNH); 1 female, Bur. Agr., Manila, C.R. Jones (NMNH); 3 females, 1 male, Manila, R. Brown (NMNH); 1 female, 2 males, Manila, iv-v.24, R.C. McGregor (CU); 1 female, Luzon, V. Rolle (Berlin); 1 female, 11.vi.31, C.S. Banks (MCZ); 1 female, Laguna de Bay nr Tatay, 16.ix.45, H.E. Milliron (Bishop); 2 females, Los Baños, ix.17, F.X. Williams (Bishop); 1 female, 1 male, Mt. Makiling (=Maquiling), 50 m, 20.vii.48-22.ix.49, L.B. Uichanco (UPLB); 1 female, Mt. Maquiling, 50 m, 7.i.51, C.R. Baltazar (UPLB); 10 females, 2 males, Mt. Makiling (=Maquiling), Laguna, C.F. Baker (NMNH); 1 female, 1 male (holotype *A. cupulifera bakeri*) Los Baños, Laguna, C.F. Baker (NMNH); 2 females, 2 males, Los Baños, Laguna, C.F. Baker (BMNH); 1 female, Pacte, Laguna, 1927, C.F. Baker (NMNH); 6 females, 1 male, San Pablo, Laguna, 21-25.x.74, I. Kudo (Hokkaido); 1 female, Atimonan, Quezon, C.F. Baker (NMNH); 1 female, Batbatan Is., 18.iv, R.C. McGregor (NMNH); 1 female, Mt. Mayon, Albay, 9.xii.53, H. Townes (AEI); 1 male, Nasugbu, Batangas, 28.ii.54, H. Townes (AEI); 1 female, Cebu, iv.17, F.X. Williams (Bishop); 1 female, Saravia, Negros Occ. (NMNH); 1 female, Momungan, Mindanao (Leiden).

Remarks. Cockerell (1916) gave the name *Allo-dape cupulifera bakeri* to the Philippine population of *B. cupulifera* because the male specimen he examined had the scape black underneath. However, several males that I have examined from

Manila and Los Baños, which I recognize as *B. cupulifera* on the basis of genital characters, have the scape either yellow or black underneath. I therefore synonymize *A. cupulifera bakeri* under *B. cupulifera*.

The female type of *Allodape hewitti sandacanensis* is quite similar to the female type of *B. hewitti* in having a yellow clypeus and being small in size as indicated by head width (1.20 mm), but it differs from *B. hewitti* by having a narrower head (HW/HL ratio 1.06) and the longer hairs on T4-6 simple. The close similarity in general appearance between the females of the two species presumably led Cockerell (1920a) to describe the female *B. cupulifera* as a variety of *B. hewitti*. Nests collected from Java containing both sexes helped separate the similar females of the two species; the male *B. cupulifera* can be easily distinguished from *B. hewitti* because of its lobed and medially excised hind trochanter.

The females are small and distinguished from other species by the slightly narrower head (HW/HL ratio 1.05-1.09), the entirely yellow clypeus (though yellow mark may be slightly reduced apically) and the longer hairs on T4-6 light brown, slanting and simple. The preceding set of characters separates this species from the similar females of *B. hewitti*. Those females with the clypeal mark reduced on the lower half of clypeus are quite similar to *B. reversa* (HW 1.47-1.73 mm) but separated from it by the relatively smaller head width (HW 1.15-1.47 mm) and the transparent to light brown longer hairs on T4-6. The males are quite similar to those of *B. reducta*, *B. reversa* and *B. signata* but are smaller.

Some variability in the male genitalia is apparent; males from West and Central Java have 4 to 5 peglike processes on the ventro-apical plate (Figs. 45, 46), while a male from Georgetown, Penang Island, Malaysia has only 3 peglike processes (Fig. 47). Twelve males from Mt. Montalban, Rizal, Philippines have dark tarsi. Most females from Java and Sumatra have yellow mandibles, but four females from Java and one from Sumatra (Leiden) have black mandibles. Five females from Sumatra, two from Java, two from Halmahera, 15 from Sandakan, Borneo and 65 from Manila, Mt. Maquilang and Los Baños, Philippines have the lower half of the clypeus partly black, the clypeal mark narrowing toward the apex (Fig. 84). Thirty-nine females from Manila with reduced clypeal mark have the mandibles and the scape black. Two females from Di Linh, Vietnam and four females from Pasoh Forest Park, Malaysia have the tibiae and tarsi reddish brown. Two females from Fyan, Vietnam have orange legs and yellow mandibles and labrum.

Braunsapis clarihirta, n. sp.

Holotype: Male, Waai, Ambon, Indonesia, 9.x.65, A.M.R. Wegner (Bishop). *Paratypes*: 2 females, same data as holotype except 1 female deposited in SMUK; 1 female, Ambon, S. Moluccas, x.49, M.A. Lieftinck (SMUK); 1 female, Ambon, 27.vii.40, M.A. Lieftinck (Leiden).

Female. Face as in Figure 86. (1) Length 4.6-7.0 mm. (2) Labrum and mandible yellow, rarely mandible black. (3) Clypeus entirely yellow. (4) Paraocular mark present, sometimes slightly reduced. (*) Scape yellow underneath. (7) HW 1.20-1.73 mm. (8) HW/HL ratio 1.08-1.12. (11) Scape at most barely reaching front ocellus. (*) Legs orange. (13) Hairs on T4-6 transparent to light brown, slanting, simple to blunt, slightly longer than width of scape; shorter hairs subprostrate, weakly spiculate.

Male. Face as in Figure 87. (14) Length 5.5 mm. (*) Scape with yellow mark underneath. (18) HW 1.43-1.70 mm. (19) HW/HL ratio 1.12-1.16. (*) Legs orange. (21) Hairs on T4-6 light brown; longer hairs suberect, longer than width of scape, simple; shorter hairs subprostrate, weakly simple. (22) Genitalia as in Figures 42-44; gonostylus longer than broad, slightly expanded at apex, with one seta (Fig. 43); ventro-apical plate of gonocoxite with 4 peglike processes (Fig. 42); penis valve with mid-lateral flange with rounded posterior margin and dorso-lateral gap about as wide as mid-lateral flange (Fig. 44).

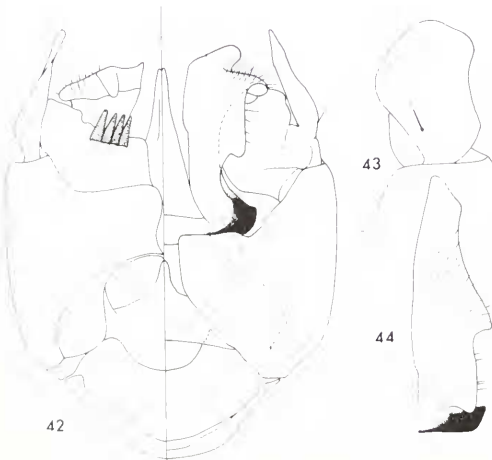
Specimens examined. In addition to type material, the following specimens are probably this species. **Thailand**. 1 female, Chantaburi, 18.vi.61, K. Iwata (Hokkaido); 1 female, Khaophanppha Khaochang, 200 m, Trang Prov., 11-12.i.64, G.A. Samuelson (Bishop); 1 female, Banna, 108 m, 5-10.v.58, T.C. Maa (SMUK). **Indonesia**. 1 female, Sibolangit, 450 m, N.E. Sumatra, 17.ix.50, M.A. Lieftinck (Leiden); 1 female, same except (SMUK); 2 females, Depok, Buitenzorg (=Bogor), 100 m, W. Java, 18.x.-42, M.A. Lieftinck (Leiden); 1 female, same except (SMUK). **Malaysia**. 3 females. Kuala Lumpur, 18.viii-17.xi.29, H.T. Pagden (BMNH); 6 females, 2 males, Kuala Lumpur, 4.iv.26-6.ix.31 (BMNH); 3 females, 2 males, Gombak Valley, Selangor, 26.xii.30-25.i.31 (BMNH); 1 female, Pasoh Forest Res., Negri s., 7.ix.78, P. and M. Becker (AEI); 1 female, Bukit Kutu, Selangor, 9.vi.29, H.M. Puddlebury (BMNH); 1 male, Gumo Mulu N.P., Sarawak, Borneo, ix-xi.77, D. Hollis et al. (BMNH); 1 female, Ranau, 8 mi. N. of Paring Hot Spring, 500 m, W. Coast Residency, N. Borneo, 9-18.x.58, T.C. Maa (Bishop). **Singapore**. 1 female, vi.29, R.H.V. van Zwaluwenburg (Bishop). **Philippines**. 1 male, Los Baños, Laguna, 18.ix.53, Townes family (AEI).

Remarks. The male type and the female paratypes from Ambon, Indonesia have orange legs,

yellow labrum and mandible, the longer hairs on T4-6 light brown and simple. The other females from W. Java, Sumatra, Borneo, Thailand and Malaysia have dark legs. Also the females from Sibolangit, Sumatra and Negri s., Malaysia (HW 1.20-1.32 mm) are quite small compared to the females from Ambon (HW 1.54-1.60 mm). Two females from W. Java have slightly reduced paraocular marks and two females from Thailand have the mandibles black. Two males from Los Baños, Laguna, Philippines have broader heads (HW 1.70 mm) and dark legs except for the mid and hind basitarsi and the rest of the tarsomeres yellow. The species recognized here may be a complex of species, but too few specimens are available to resolve the matter.

The presence of yellow clypeus and paraocular marks in females is shared with *B. palavanica*. Such convergence of facial markings is probably common and quite similar to the case of the females of *B. cupulifera* and *B. hewitti*. The females of *B. clarihirta* can be distinguished from *B. palavanica* by having transparent to light brown hairs on T4-6, scape with a yellow mark underneath, mandibles with large yellow mark and some females are smaller, especially those from Java, Sumatra, Malaysia and Thailand (HW 1.20-1.50 mm).

The name *clarihirta* is derived from the Latin *clarus*, meaning clear, plus the Latin *hirtus*, meaning hairy, referring to the transparent hairs on T4-6.



Figures 42-44. Male genitalia of *B. clarihirta* (holotype), Ambon, Indonesia. Fig. 42. Dorsal (right) and ventral (left) view of genitalia. Fig. 43. Gonostylus, lateral view. Fig. 44. Penis valve, dorso-apical view.

Braunsapis apicalis, n. sp.

Holotype: female, Sandakan, Borneo, Malaysia, C.F. Baker (NMNH). *Paratypes*: 1 female, Mt. Semeroe, 800 m, S.E. Java, 6-13.vi.41, M.A. Lieftinck (Leiden); 1 female, Fraser's Hill, Malaya, 25.xii.64, R. Ohgushi (Hokkaido).

Female. Face as in Figure 88. (1) Length 5.9-6.2 mm. (2) Labrum fusco-ferrugineous, mandible with yellow spot. (3) Clypeus partly black below with clypeal mark narrowed toward apex. (4) Paraocular mark present. (*) Scape sometimes with small yellow spot underneath. (*) Small yellow spot on lower posterior orbit of compound eyes. (7) HW 1.47-1.67 mm (1.53 mm). (8) HW/HL ratio 1.10-1.15 (1.15). (10) Middle of epistomal suture slightly raised. (11) Scape barely reaching front ocellus. (*) Scopa light fuscous. (13) Hairs on T4-6 light brown; longer hairs slanting, simple, longer than width of scape; shorter hairs prostrate, weakly spiculate.

Additional specimens examined. **Malaysia**. 1 female, Fraser's Hill, 25.xii.64, R. Ohgushi (Hokkaido). **Indonesia**. 1 female, Mt. Semeroe, 800 m, S.E. Java, 6-13.vi.41, M.A. Lieftinck (SMUK).

Remarks. This species is remarkable in having the clypeal mark narrowing toward the apex but the paraocular marks present. The female of *B. apicalis* is quite similar to that of *B. lateralis* but differs from it by being smaller as shown by the head width (HW 1.47-1.67 mm) and in having the longer hairs on T4-6 light brown and simple. It is comparable in size to *B. clarihirta* but the lower half of the clypeus is partly black and the mandibles dark.

The type has a small yellow spot underneath the scape and a small spot on the mandible and both it and the two paratypes have a yellow mark on the lower posterior orbit of the compound eye. A second female from S.E. Java has no yellow on the posterior orbit but yellow marks on the outer surfaces of the fore and hind femora; its scopa is transparent, the hind femur orange and the tarsi are reddish orange. Except for this variation, it is quite similar to one of the paratypes from the same locality and is, therefore, included under this species.

The name *apicalis* is derived from the Latin *apiculus*, meaning apex, referring to the yellow clypeal mark narrowing strongly toward the apex of the clypeus.

Braunsapis lateralis, n. sp.

Holotype: female, Ranu River, Tengah, Sulawesi, Indonesia, 11.ii.80, P. Kevan (SMUK). *Paratypes*: 6 females, same data except dates 2-16.ii.80 (SMUK); 2 females, same except (NMNH); 2 females, same except (BMNH).

Female. Face as in Figure 89. (1) Length 5.6–7.1 mm. (2) Labrum sometimes with small yellow spot, mandible with yellow mark. (3) Clypeus largely black with a T-shaped clypeal marking. (4) Paraocular mark present. (6) Tegula translucent fuscous, axillary sclerites mixed. (7) HW 1.70–2.00 mm (2.00 mm). (8) HW/HL ratio 1.14–1.20 (1.20). (11) Scape reaching front ocellus. (12) Apex of basitibial plate represented by small conical protuberance. (13) Hairs on T4–6 fuscous; longer hairs suberect, about as long as width of scape, blunt; shorter hairs subprostrate, simple.

Additional specimens examined. **Malaysia.** 1 female, Sandakan, Borneo, Baker (NMNH). **Indonesia.** 2 females, Ranu River, Tengah, Sulawesi, 11.ii.80, P. Kevan (SMUK).

Remarks. This species is closely allied to *B. apicalis* from Java and Borneo and *B. boharti* from the Solomon Islands. The female of *B. boharti* differs from *B. lateralis* by having the middle of the epistomal suture elevated, the wings translucent fuscous (hyaline in *B. lateralis*), the clypeal and paraocular yellow areas more reduced and the labrum and mandible black (with yellow marks in *B. lateralis*). Two females were not included among the paratypes. One has the clypeal mark slightly broader on the lower half of the clypeus compared to the rest of the series. The other from the same locality does not have the paraocular marks but otherwise fits the description of the species and therefore is included here.

The name *lateralis* is Latin, meaning of the side, referring to the yellow marks on the paraocular area.

Braunsapis reducta (Cockerell), new status

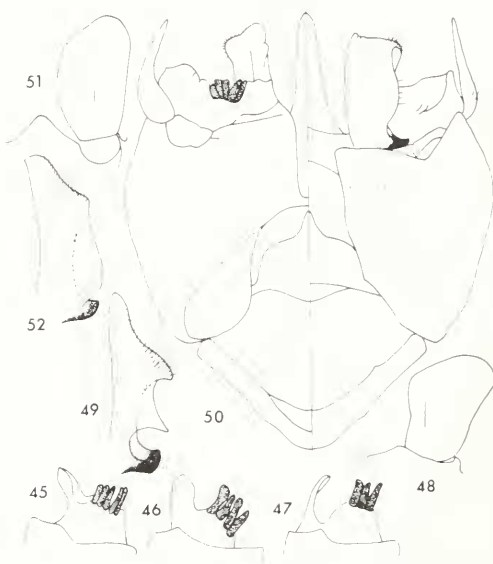
Allodape mindanaonis reducta Cockerell, 1916: 302. Type: male, Dapitan, Mindanao, Philippines (NMNH).

Female. Face as in Figure 90. (1) Length 6.0–6.7 mm. (2) Labrum and mandible yellow. (3) Clypeus largely black with clypeal mark T-shaped. (*) Scape yellow underneath. (7) HW 1.57–1.91 mm. (8) HW/HL 1.16–1.19. (10) Middle of epistomal suture not raised. (11) Scape reaching front ocellus. (*) Mesepisternum with shallow oblong punctures containing finer punctures. (12) Basitibial plate carina weak. (13) Hairs on T4–6 transparent; longer hairs slanting, spiculate; shorter hairs subprostrate, spiculate.

Male. Face as in Figure 91. (14) Length 5.2–5.6 mm. (18) HW 1.60–1.77 mm (1.60 mm). (19) HW/HL ratio 1.16–1.22 (1.18). (21) Hairs on T4–6 transparent; longer hairs suberect, blunt to spiculate; shorter hairs subprostrate, spiculate. (22) Genitalia (n = 3) as in Figures 50–52; ventro-apical plate of gonocoxite with 4–5 sunken peglike processes (Fig. 50); gonostylus longer than broad, with one seta (Fig. 51); penis valve with mid-lateral flange narrowed, flange with posterior margin rounded and dorso-lateral gap less than the width of mid-lateral flange (Fig. 52).

Specimens examined. **Malaysia.** 3 males, Tenompok, Borneo, 10–14.ii.59, T.C. Maa (Bishop). **Indonesia.** 1 female, Sungai Dareh, Sumatera Barat, 11.x.83, T. Inoue (Hokkaido); 1 female, Sulawesi, 8.viii.85, C. Young (CMNH); 2 females, Flores, S.G. Rensch (Berlin). **Philippines.** 39 (including holotype of *A. mindanaonis reducta*) females, 2 males, Dapitan, Mindanao, C.F. Baker (NMNH); 5 females, 1 male, same except (SMUK); 8 females, Tacloban, Leyte, C.F. Baker (NMNH), 1 female, Samar, C.F. Baker (NMNH); 1 female, Horns of Negros, Dumaguete, Negros Is., J.W. Chapman (MCZ); 1 female, Mt. Iriga, 500–600 m, Camarines Sur, 27.iv.62, H.M. Torrevillas (Bishop); 1 female, Mt. Makiling (= Maquiling), Laguna, C.F. Baker (NMNH); 1 female, Bangui, Luzon, xi.23, R.C. McGregor (NMNH); 1 female, Subic Bay, Grand Is., Luzon, 7.x–15.xi.67, C.E. Goodpasture (LNHM).

Remarks. This form is sufficiently distinct that it is elevated to species rank. The females are distinguished by the T-shaped clypeal mark (Fig. 90), the labrum and mandible yellow and the hairs on T4–6 transparent. It is quite similar to *B. reversa* and *B. signata* except in those species the



Figures 45–49. Male genitalia of *B. cupulifera*, Java and Malaysia. Figs. 45–47. Ventro-apical plates of the gonocoxite, from Boyolali, Central Java; Bogor, West Java; and Georgetown, Penang, Malaysia, respectively. Fig. 48. Gonostylus, lateral view. Fig. 49. Penis valve, dorso-apical view.

Figures 50–52. Male genitalia of *B. reducta*, Dapitan, Mindanao, Philippines. Fig. 50. Dorsal (right) and ventral (left) view of male genitalia. Fig. 51. Gonostylus, lateral view. Fig. 52. Penis valve, dorso-apical view.

clypeal mark is not T-shaped and the longer hairs on T4-6 are light brown to fuscous. The males are also similar to *B. clarihirta*, *B. reversa* and *B. signata* except for the presence of paraocular marks and the ventro-apical plate of the gonocoxite having 4 to 5 sunken peglike processes in *B. reducta* (Fig. 50).

The scape of two females from Flores is ferrugineous in part, the labrum black, and the mark on the lower part of clypeus is broader than in those from Mindanao. Also, a female from Sumatra has a broader yellow mark on the lower half of the clypeus. Males from Borneo have the scape black underneath and the paraocular marks relatively reduced compared to those from the type locality.

Braunsapis reversa (Cockerell)

Allodape reversa Cockerell, 1916: 303. Type: male, Puerto Princesa, Palawan, Philippines (NMNH).

Female. Face as in Figure 92. (1) Length 5.0-6.4 mm. (2) Labrum fusco-ferrugineous, mandible with yellow mark, sometimes reduced to small spot. (3) Clypeus partly black below with clypeal mark narrowing toward apex. (7) HW 1.47-1.73 mm. (8) HW/HL ratio 1.14-1.18. (10) Middle of epistomal suture not raised. (11) Scape reaching front ocellus. (12) Basitibial plate carina weak. (*) Scopa with dark goldenbrown patch on distal half of outer surface. (13) Hairs on T4-6 fuscous; longer hairs slanting, simple; shorter hairs subprostrate, simple.

Male. Face as in Figure 93. (14) Length 4.4-5.0 mm. (17) Paraocular mark absent. (18) HW 1.47-1.57 mm (1.47 mm). (19) HW/HL ratio 1.20-1.24 (1.22). (21) Hairs on T4-6 fuscous; longer hairs suberect, simple; shorter hairs subprostrate, simple. (22) Genitalia (n=4) as in Figures 53-55; ventro-apical plate of gonocoxite with 5 peglike processes (Fig. 54); gonostylus longer than broad, slightly expanded apically (Fig. 53); penis valve with mid-lateral flange expanded with angulate posterior margin and dorso-lateral gap wider than the mid-lateral flange (Fig. 55).

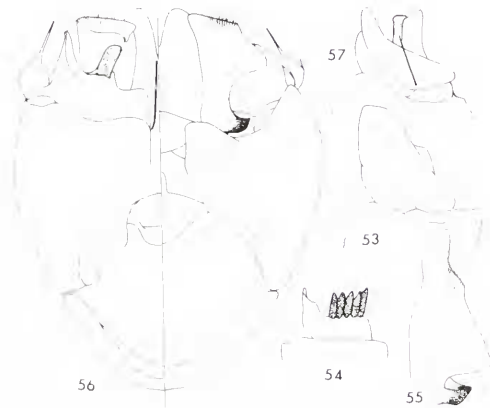
Specimens examined. **Philippines.** 38 females, 9 males (including holotype), Puerto Princesa, Palawan, C.F. Baker (NMNH); 24 females, Pinigisan, 600 m, Mantalingajan, Palawan, 2-22.ix.61, Noona Dan Exp. 61-62 (ZM); 1 female, Uring Uring, Brooke's Point, Palawan, 25.viii.61, Noona Dan Exp. (ZM).

Remarks. This species is closely allied to *B. signata* and the females of both can be distinguished from those of *B. philippinensis* and *B. pitaris* by the presence of a yellow mark on the mandible, the light brown to fuscous hairs on T4-6 and the clypeal marking more narrowed toward the apex (Fig. 92). The females of *B. reversa* can be separated from *B. signata* by having the outer surface of the scopa with golden-brown patch of hairs on its distal half. The male of *B. reversa* has a broader head (HW/HL ratio 1.20-1.24) but is smaller in size (HW 1.47-1.57 mm) than *B. signata*. It can be separated easily from the male of *B. reducta* by the absence of paraocular marks, the fuscous longer hairs on T4-6, and its smaller size.

Braunsapis signata, n. sp.

Holotype: female, Surigao, Mindanao, Philippines, C.F. Baker (NMNH). *Paratypes:* 2 females, 1 male, same data as holotype (NMNH); 2 females same data as holotype except (SMUK); 5 females, Davao, Mindanao, Philippines, C.F. Baker (NMNH); 2 females, same except (SMUK); 2 females, Billiran, Philippine Islands, 1927, C.F. Baker (NMNH); 1 male, Mt. Mayon, Albay, Philippines, 9.xii.53, H. Townes (AEI).

Female. Face as in Figure 94. (1) Length 6.0-7.0 mm. (2) Labrum ferrugino-testaceous to fusco-ferrugineous, mandible with large yellow mark. (3) Clypeus partly black below with clypeal mark narrowing toward apex. (6) Tegula transparent, axillary sclerites yellow, primary sclerite with dark spot medially. (7) HW 1.69-1.91 mm (1.80 mm). (8) HW/HL ratio 1.11-1.16 (1.15). (10) Middle of epistomal suture not raised. (11) Scape reaching front ocellus. (12) Basitibial plate carina weak. (*) Outer surface of scopa with dark patch of hairs on distal half of hind tibia. (13) Hairs on T4-6 light brown to fuscous; longer



Figures 53-55. Male genitalia of *B. reversa*, Puerto Princesa, Palawan, Philippines. Fig. 53. Gonostylus, lateral view. Fig. 54. Ventro-apical plate of gonocoxite. Fig. 55. Penis valve, dorso-apical view.

Figures 56, 57. Male genitalia of *B. signata* (paratype), Surigao, Mindanao, Philippines. Fig. 56. Dorsal (right) and ventral (left) view of male genitalia. Fig. 57. Gonostylus, lateral view.

hairs slanting, simple; shorter hairs subprostrate, simple.

Male. Face as in Figure 95. (14) Length 5.0 mm. (17) Paraocular mark absent. (18) HW 1.60 mm. (19) HW/HL ratio 1.15. (21) Hairs on T4-6 light brown; longer hairs suberect, simple; shorter hairs slanting, simple. (22) Genitalia as in Figures 56, 57; ventro-apical plate of gonocoxite with one peglike process (Fig. 56); gonostylus longer than broad, slightly tapering toward the apex, with one seta (Fig. 57); penis valve similar to that of *B. reversa* (Fig. 55).

Remarks. The outer surface of the female scopa has a patch of dark hairs on the distal half and the males have the ventro-apical plate with only one peg (Fig. 56) and the gonostylus slightly tapering toward the apex (Fig. 57).

The name *signata* is derived from the Latin *signatus*, meaning mark, referring to the distinctive patch of dark hairs marking the outer surface of the scopa.

Braunsapis aurantipes, n. sp.

Holotype: male, Fyan, 1200 m, Vietnam, 11.vii-9.viii.61, N.R. Spencer (Bishop). *Paratypes:* 1 female, 1 male, same data as holotype except male deposited in SMUK.

Female. Face as in Figure 96. (1) Length 4.8-6.2 mm. (2) Labrum and mandible yellow, mandibular mark sometimes reduced. (3) Clypeus partly black below with clypeal mark narrowing toward apex. (4) Paraocular mark reduced to very small yellow spot. (*) Scape yellow underneath. (6) Tegula transparent, axillary sclerites yellow. (7) HW 1.23 mm. (8) Head as long as broad. (10) Middle of epistomal suture raised. (11) Scape not reaching front ocellus. (12) Basitibial plate carina indistinct. (*) Legs orange. (13) Hairs on T4-6 transparent; longer hairs suberect, simple, longer than width of scape; shorter hairs subprostrate to slanting, simple.

Male. Face as in Figure 97. (14) Length 3.8-4.5 mm. (15) Labrum and mandible yellow. (16) Clypeus entirely yellow. (17) Paraocular mark present. (*) Scape yellow underneath. (18) HW 1.20 mm. (19) HW/HL ratio 1.04-1.06 (1.04). (20) Hind trochanter excised medially and lobed distally. (*) Legs orange. (21) Hairs on T4-6 light brown; longer hairs suberect, simple, longer than width of scape; shorter hairs subprostrate, simple. (22) Genitalia as in Figures 58-60; ventro-apical plate of gonocoxite with 2 peglike processes (Fig. 58); gonostylus longer than broad with one seta; penis valve with mid-lateral flange broad with slightly angulate posterior margin (Fig. 60).

Remarks. The female is unique in having the following combination of characters: head about as long as wide, legs orange, clypeal marking narrowing toward the apex, small paraocular marks and face glossy. The male antennal sockets

are less sunken and the face is slightly convex and glossy compared to males of *B. cupulifera* and *B. clarihirta*.

The name *aurantipes* is derived from the Latin *aurantus*, meaning orange, plus the Latin *pes*, meaning foot, referring to the orange colored legs.

Braunsapis indica, n. sp.

Holotype: female, 10 km N.W. of Udagamanadalam (=Ooty), 2000 m, Tamil Nadu State, 17.viii.90, C.D. Michener (SMUK). *Paratype:* female, Kodaikanal, 6500 ft., Pulney Hills, S. India, iv-v.53, P.S. Nathan (NMNH).

Female. Face as in Figure 98. (1) Length 7.3 mm. (2) Labrum and mandible black. (3) Clypeus largely black with clypeal mark T-shaped. (4) Paraocular mark absent. (6) Tegula translucently fuscous, axillary sclerites yellow, primary sclerite with large dark medial spot. (7) HW 1.61 mm. (8) HW/HL ratio 1.01. (10) Middle of epistomal suture slightly raised. (11) Scape reaching front ocellus. (12) Basitibial plate carina weak. (*) Outer surface of scopa with patch of golden hairs on distal half. (13) Hairs on T4-6 transparent; longer hairs slanting, weakly spiculate; shorter hairs prostrate, weakly spiculate.

Remarks. This species can easily be distinguished by the T-shaped clypeal mark and the head longer than broad. A species from Madagascar, *B. madecassa* (Benoist), is quite similar in appearance as well as having the head as long as broad. However, *B. indica* differs from *B. madecassa* by having the clypeus mainly black with



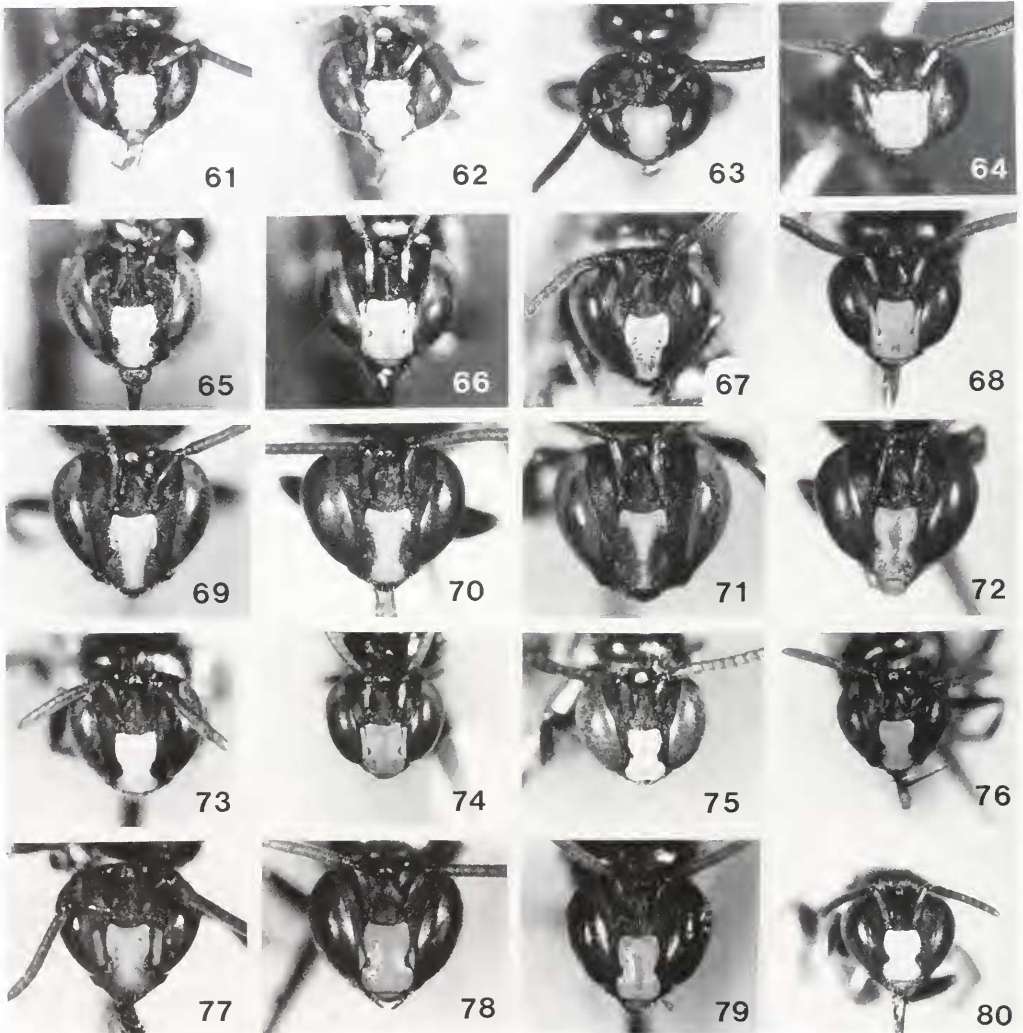
Figures 58-60. Male genitalia of *B. aurantipes* (paratype), Fyan, Vietnam. Fig. 58. Dorsal (right) and ventral (left) view of male genitalia. Fig. 59. Ventro-apical plate of gonocoxite. Fig. 60. Penis valve, dorso-apical view.

a slender T-shaped yellow mark, the scopa with a patch of golden hairs on the outer surface and larger size as indicated by the head width (1.61 mm).

The name *indica* is derived from the Latin *indicus*, meaning Indian, referring to the country where this species is found.

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Figures 61-80. Facial views. Figs. 61, 62. *B. breviceps*, female and male, Boyolali, Central Java, Indonesia. Figs. 63, 64. *B. kaliago*, female paratype and male holotype, Mehruli, Delhi, India. Figs. 65, 66. *B. mixta*, female and male, Mehruli, Delhi, India. Figs. 67, 68. *B. picitarsis*, female and male paratypes, Minikoi, Laccadive Archipelago. Figs. 69-72. *B. philippinensis*, females and males, Dapitan, Mindanao, and Mt. Makiling (= Maquilung), Luzon, respectively. Figs. 73-75. *B. hewitti*, female and male, Boyolali, Central Java, and a male from Takao, Taiwan, respectively. Fig. 76. *B. flaviventris*, female holotype, Nabon, Thailand. Figs. 77-79. *B. palavanica*, female and males, Puerto Princesa, Palawan, Philippines. Fig. 80. *B. malliki*, female, Ullal, Mangalore, Karnataka, India.

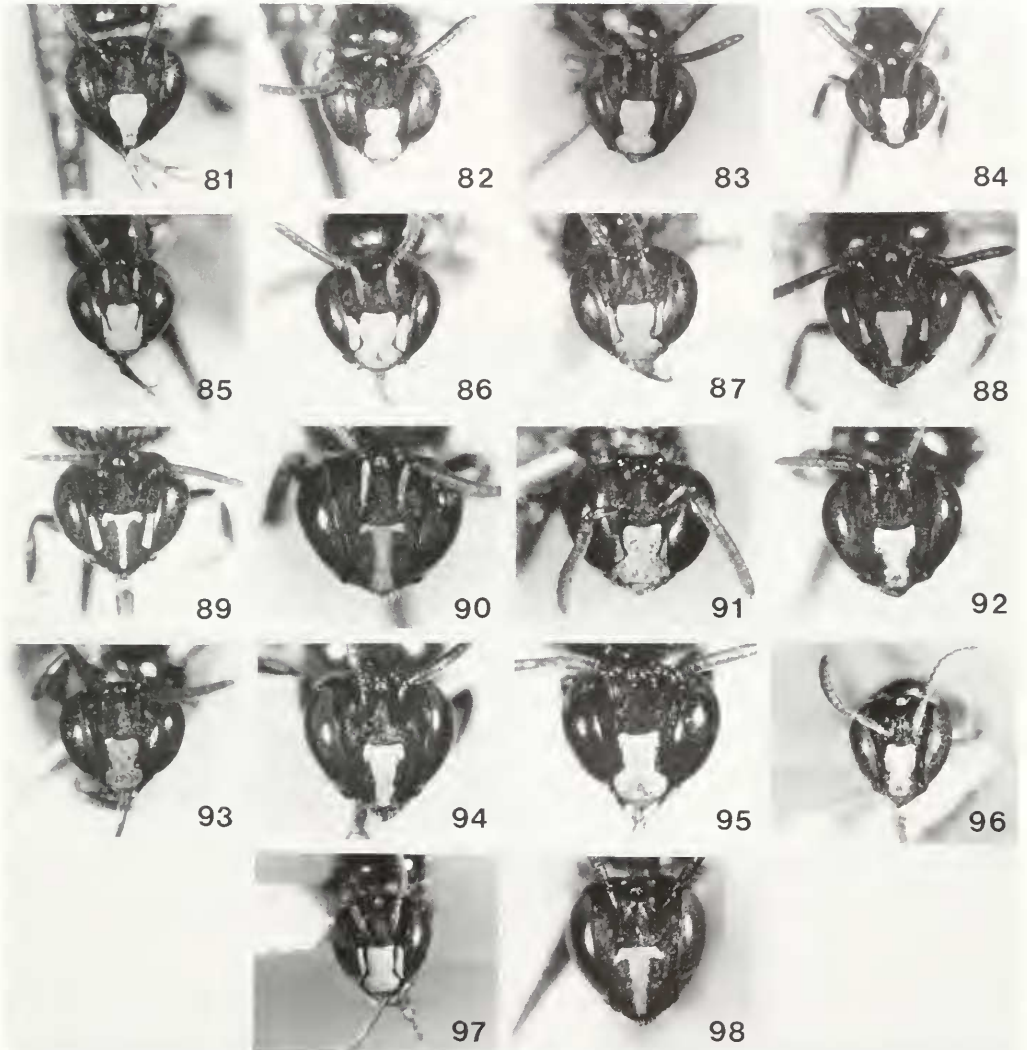
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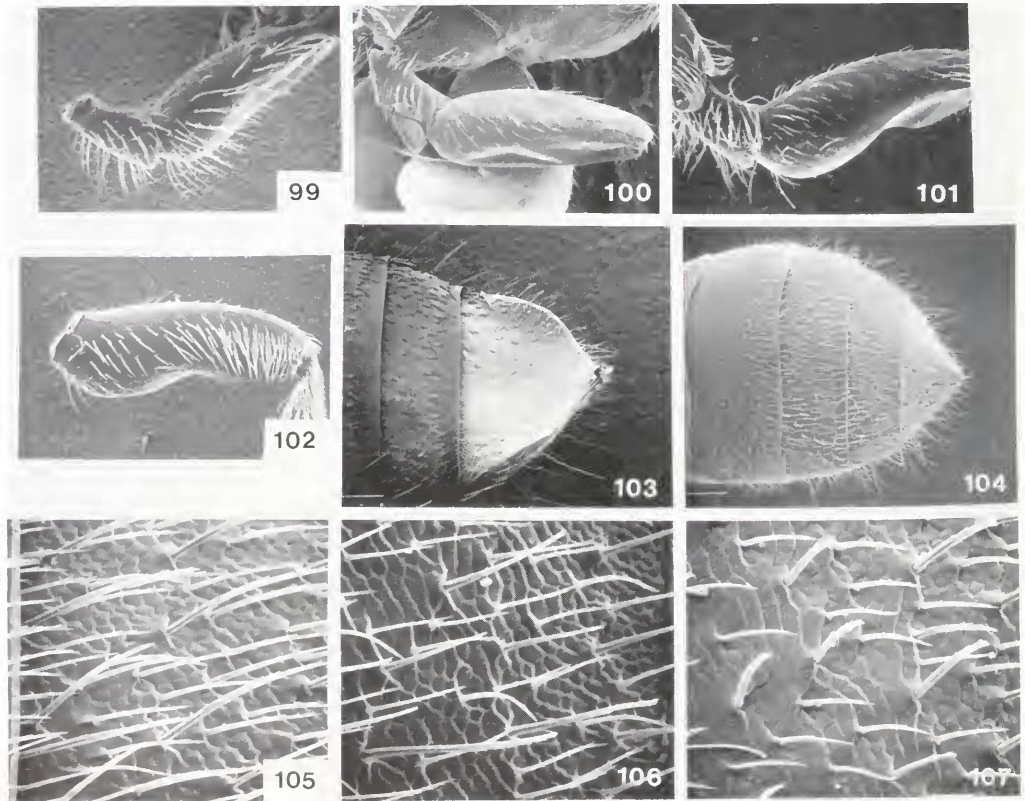
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Figures 81-98. Facial views. Figs. 81, 82. *B. puangensis*, female and male, Ampang, Malaysia. Figs. 83-85. *B. cupulifera*, females, Nabon, Thailand and West Java, Indonesia, respectively, and male, Manila, Philippines. Figs. 86, 87. *B. clarihirta*, female paratype and male holotype, Ambon, Indonesia. Fig. 88. *B. apicalis*, female holotype, Mt. Semeroe, Java, Indonesia. Fig. 89. *B. lateralis*, female paratype, Sulawesi, Indonesia. Figs. 90, 91. *B. reducta*, female and male, Dapitan, Mindanao, Philippines. Figs. 92, 93. *B. reversa*, female and male, Puerto Princesa, Palawan, Philippines. Figs. 94, 95. *B. signata*, female holotype and male paratype, Surigao, Mindanao, Philippines. Figs. 96, 97. *B. auranipes*, female paratype and male holotype, Fyan, Vietnam. Fig. 98. *B. indica*, female paratype, Kodaikanal, Pulney Hills, S. India.

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Figures 99-102. Male hind trochanter and femur. Fig. 99. *B. mixta*. Fig. 100. *B. cupulifera*. Figs. 101, 102. Outer and inner view, *B. puangensis*.

Figures 103, 104. Sixth metasomal tergum. Fig. 103. Scoop-shaped T6 of *B. breviceps*. Fig. 104. Simple T6 of *B. hewitti*.

Figures 105-107. Hairs on T4-6. Fig. 105. *B. puangensis* (simple). Fig. 106. *B. hewitti* (blunt). Fig. 107. *B. mixta* (spiculate).

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